USER MANUAL

SCH275KTL-DO/US-800 Grid-Tied PV Inverter

CHINT POWER SYSTEMS AMERICA CO., LTD.

REVISION 1.0 NOVEMBER 2021

Table of Contents

0 Preface

Thank you for choosing a CPS Grid-tied PV Inverter (hereinafter referred to as “PV Inverter”) developed by CHINT POWER SYSTEMS AMERICA CO., LTD (hereinafter referred to as "CPS").
This PV Inverter is a high performance and highly reliable product specially designed for the North American Solar market.

IMPORTANT!

Please read this manual carefully and make sure that you have understood all the contents thoroughly before you start any operation.

Main Contents

This Installation and Operation manual contains important information, safety guidelines, detailed planning and setup information for installation, as well as information about configuration, operation and troubleshooting. Be sure to read this manual carefully before using.

Target Readers

- Plant owner
- Project Engineer
- Installation engineer
- Maintenance engineer

Installation, commissioning, troubleshooting, and maintenance of the inverter must be done only by qualified personnel. If you encounter any problems during the above mentioned operation, please check the user manual carefully. You can also contact your local dealer or supplier for help if the problem still exists.

Manual Management

Please keep this user manual on hand for quick reference.

Copyrights

Version

This manual is subject to change or modification without prior notice. Users can get the latest manual from our sales channel or our official website: www.chintpower.com.

1 IMPORTANT SAFETY INSTRUCTIONS (SAVE THESE INSTRUCTIONS)

Please read this user manual carefully before the installation and operation of this PV Inverter. CPS reserves the right to refuse warranty claims for equipment damage if users fail to install the equipment according to the instructions in this manual.

Failure to follow these instructions and other relevant safety procedures may result in voiding of the warranty and/or damage to the inverter or other property!

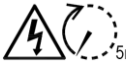
1.1 Warnings and Symbols in this Document

Symbols	Meanings
	**DANGER!** DANGER indicates a hazardous situation with high level of risk which, if not avoided, will result in death or serious injury. **DANGER!** DANGER indique une situation dangereuse avec un niveau de risque élevé qui, si elle n'est pas évitée, entraînera la mort ou des blessures graves.
	**WARNING!** WARNING indicates a hazardous situation with medium level of risk which, if not avoided, could result in death or serious injury. **ATTENTION!** AVERTISSEMENT indique une situation dangereuse avec un niveau de risque moyen qui, si elle n'est pas évitée, pourrait entraîner la mort ou des blessures graves.
	**CAUTION!** CAUTION indicates a hazardous situation with low level of risk which, if not avoided, could result in minor or moderate injury. **AVERTIR!** ATTENTION indique une situation dangereuse avec un faible niveau de risque qui, si elle n'est pas évitée, pourrait entraîner des blessures mineures ou modérées.
	**NOTICE!** NOTICE indicates a hazardous situation which, if not avoided, could result in equipment working abnormally or property loss. **AVIS!**

	indique une situation dangereuse qui, si elle n'est pas évitée, pourrait entraîner un fonctionnement anormal de l'équipement ou la perte de biens.
	**IMPORTANT!** INSTRUCTION indicates important supplementary information or provides skills or tips that can be used to help you solve a problem or save you time. **IMPORTANT!** indique des informations supplémentaires importantes ou fournit des compétences ou des conseils qui peuvent être utilisés pour vous aider à résoudre un problème ou vous faire gagner du temps.

Table 1-1 Warnings and Symbols in this Document

1.2 Markings on the Product

Symbols	Meanings
	**WARNING:** Risk of Electric Shock. **ATTENTION:** Risque de choc electrique.
	**CAUTION:** Risk of electric shock from energy stored in capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply. **ATTENTION:** Risque de choc électrique à partir d´énergie stockée dans les condensateurs. Retirer le couvercle du boîtier au moins 5 minutes après avoir débranché toutes les sources d´approvisionnement.
	**CAUTION:** Hot surfaces. To reduce the risk of burns. Do not touch. **ATTENTION:** Surface chaude. Pour réduire le risqué de brûlures ne pas toucher.
	For more details please see the user manual. Pour plus de détails, veuillez consulter le manuel d'utilisation.

	**WARNING:** For continued protection against risk of fire, replace only with same type and ratings of fuse. Refer to instruction manual for details. **ATTENTION:** Pour continuer d'assurer la protection contre les risques d'incendie, il faut remplacer les fusibles de même type et courant. Reportez-vous au manuel d'instructions pour plus de détails.
	**EARTH GROUND!** This symbol marks the location of a grounding terminal, which must be securely connected to the earth through the PE (protective earthing) cable to ensure operational safety. **TERRE TERRE !** Ce symbole marque l'emplacement d'une borne de mise à la terre, qui doit être solidement connectée à la terre via le câble PE (mise à la terre de protection) pour assurer la sécurité de fonctionnement.
	**RoHS SYMBOL** In accordance with 2011/65/EU regulations, the inverter imposes restrictions on the use of specific hazardous substances in electrical and electronic equipment. **SYMBOLE RoHS** Conformément à la réglementation 2011/65/UE, l'onduleur impose des restrictions sur l'utilisation de substances dangereuses spécifiques dans les équipements électriques et électroniques.
	**TUV Certification** This inverter has passed TUV Certification. **Certification TUV** Cet onduleur a passé la certification TUV.
	Phase information of the inverter. Information de phase de l'onduleur.

Table 1-2 Markings on the Product

1.3 Safety Instructions of Operating the PV Inverter

	**DANGER!** Disconnect the inverter from PV modules and the AC grid before maintaining and operating the equipment. Make sure hazardous high voltage and energy inside the equipment has been discharged.

	Do not operate or maintain the inverter until at least 5 minutes after disconnecting all sources from DC and AC sides. The DC conductors of this PV system are normally ungrounded but will become intermittently grounded without indication when the inverter measures the PV array isolation. If there is a fault and it is unsafe to access the inverter: 1. Notify someone else. Initiate emergency mitigation plan if necessary. If smoke or fire exists, procure a fire extinguisher. 2. If a fire has escaped the inverter enclosure – notify 911 immediately! 3. Turn OFF the AC feed breaker as soon as possible/safe. 4. If safe but conditions are deteriorating, consider: a) Using the fire extinguisher. b) Cutting the string conductors – one cable at a time with insulated cutters (while wearing appropriate PPE). 5. Monitor conditions until low irradiation ~30min prior to sunset. If safe, turn OFF DC switches on the inverter and AC switches/disconnect external to the inverter and proceed with normal troubleshooting procedures, refer to Troubleshooting chapter.
	**WARNING!** All the installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the AC grid before maintaining and operating the equipment. **Risk of electric shock and fire.** Use only with PV modules that in conformance with the maximum system voltage. **Electric shock Hazard.** The DC conductors of this photovoltaic system are normally ungrounded but will become intermittently grounded without indication when the inverter measures the PV array isolation. **Shock Hazard.** The inverter is energized from both AC and DC sources. Disconnect all sources before servicing. The DC Switch is rated to break loads under normal operating conditions. However, a DC short circuit could be hazardous and the following procedures should be followed before turning OFF the DC Switch under fault conditions.
	**CAUTION!** Please ensure the mounting bracket is properly installed before hanging the inverter and wire-box on the bracket. This AFCI device automatically resets and may only be used when allowed by NFPA 70 and CSA C22.1.

	**NOTICE!** This inverter is designed to connect AC power only to the public grid. Do not connect the AC output of this equipment directly to any private AC power equipment.
	**IMPORTANT!** Please check with your local electricity supply company before selecting a Grid Code. If the inverter is operated with a wrong Grid Code, the electricity supply company may cancel the interconnection agreement. Placing the inverter into operation before the overall system complies with the national rules and safety regulations of the application is not permitted. If there is a fault and it is safe to access the inverter: 1. Read/record the fault code(s) displayed on the APP interface. 2. Turn OFF the inverter via the APP or Remote access. 3. Turn OFF the AC feed breaker or AC fuse switch disconnect. 4. If possible, read the DC MPPT currents displayed on the APP interface: a) If the MPPT current is lower than 20A or the irradiation is obviously low, turn OFF the DC switch. b) If it is safe to open the front cover, proceed with troubleshooting procedures. Make sure appropriate safety precautions and PPE are used. 5. If it is not possible to read the DC MPPT currents through the APP interface, and no fire, smoke or voltage (AC or DC) to ground is present in the enclosure: a) Follow general safety practices including PPE to open the wire-compartment. b) Measure the DC current on each string. If zero, open the fuse holder (when installed) for each string reading approximately zero amps. c) If the DC current is higher than 0.25A, do not open the fuse holder (when installed). d) When all possible fuses (when installed) are open, measure each MPPT current. If it is lower than 20A, turn OFF the DC switch. e) If turning OFF the DC switch causes smoke, then (if safe) turn the DC switch back ON and wait until low irradiation ~30min prior to sunset to continue troubleshooting.

Table 1-3 Safety Instructions of Operating the PV Inverter

2 Product Introduction

2.1 Inverter for Grid-tied PV Systems

CPS 3-Phase String Inverters SCH275KTL-DO/US-800 series are designed for Commercial and Utility scale PV grid-tied systems. The system is generally made up of PV modules, DC power distribution equipment, PV inverter and AC power distribution equipment, as shown in Figure 2-1. The solar energy is converted by PV modules to DC power, and then inverted by the inverter to AC power with the same frequency and phase as the AC grid. Now the AC power can be supplied in all or in part to local loads, with the remaining power fed to the grid.

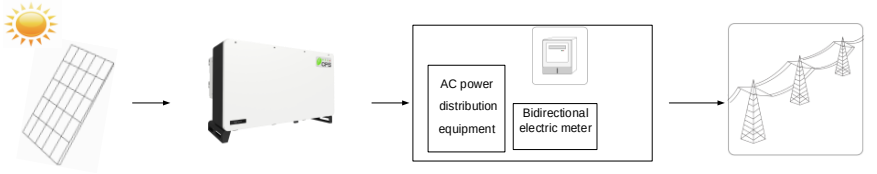


Figure 2-1 Grid-tied PV system

2.2 Product Appearance and Dimensions

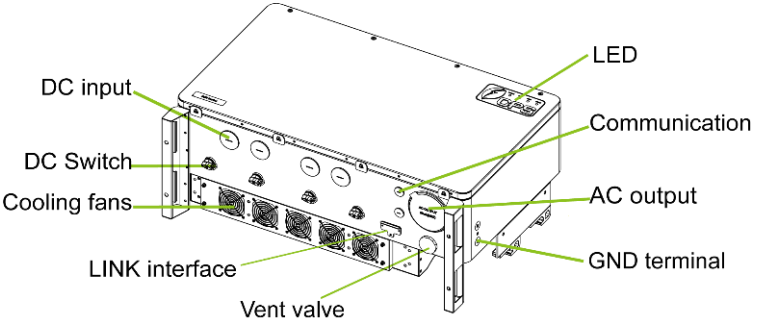


Figure 2-2 Product appearance

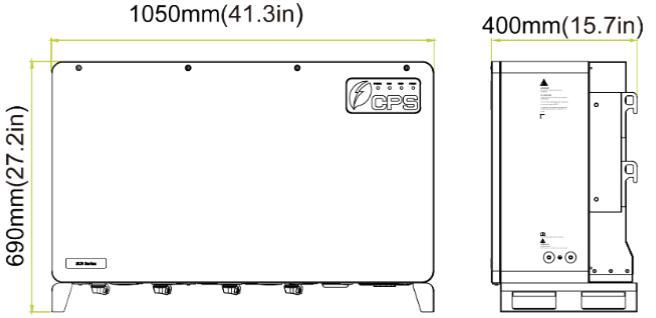


Figure 2-3 Product dimensions

2.3 Product Features

- High conversion efficiency
  - Advanced 3-level conversion technology with SVPWM
  - Max. efficiency: 99%
  - CEC efficiency: 98.5%
- Grid adaptability
  - IEEE 1547 2003, IEEE 1547 2014, IEEE 1547 2018, Rule 21, and ISO-NE standards applicable
  - Reactive power adjustable
  - PF value: ±0.8, Remote Curtailment
- Flexible communication
  - Supports standard Modbus RS485 and TCP/IP/PLC/CAN/ETHERNET communications to ensure compatibility with 3rd party monitoring and control systems.
- Wide DC input voltage range
  - Operating DC Input Voltage Range: 500-1450Vdc
  - Max DC input voltage: 1500V
- Long Service Life
  - Uses both thin-film capacitors and electrolytic capacitors to extend inverter's service life
- High protection degree:
  - NEMA Type 4X enclosure meets the demanding needs of both indoor and outdoor use
  - DC switch can be locked in the OFF position to avoid accidental turning on
- Intelligent Integration:
  - Integrated load break rated DC disconnect switches,
  - Up to 36 fused string inputs eliminate the need for external combiner boxes, simplifying installation

2.4 Product Protection Functions

- AC and DC short circuit protection
- AC output voltage and frequency monitoring
- Leakage current against ground monitoring
- DC Input over-current protection
- DC input insulation against ground monitoring
- DC injection of AC output
- Anti-islanding protection with bi-directional frequency perturbation
- DC Input and AC output over-voltage protection
- External environmental temperature monitoring
- IGBT power module temperature monitoring

2.5 Smart Inverter Functions and Default Activation

Function	IEEE1547-2018	Rule 21	ISO-NE
Anti-islanding	Enabled	Enabled	Enabled
Low/High Voltage Ride-through	Enabled	Enabled	Enabled
Low/High Frequency Ride-through	Enabled	Enabled	Enabled
Dynamic Volt/VAR Operation	Enabled	Enabled	Enabled
Ramp Rate	Enabled	Enabled	Enabled
Fixed Power Factor	Disabled	Disabled	Disabled
Reconnect by “Soft-Start”	Enabled	Enabled	Enabled
Frequency-Watt	Enabled	Enabled	Enabled
Volt/Watt	Enabled	Enabled	Enabled

Table 2-1 Smart inverter functions and default activation

2.6 Anti-islanding Detection

The inverter includes Anti-Islanding detection as required by UL1741/IEEE1547. It will continuously make bi-directional perturbations to the frequency of the output current by injecting a small amount of reactive power in order to detect a possible islanding condition. If the grid is stable, these small perturbations will have negligible effects on the system voltage frequency. However, in an islanded condition the changes in reactive power will force the frequency of the system voltage to deviate significantly, which will trigger the inverter to cease operation and disconnect from the grid.

2.7 Surge Suppression

Standard Waveform Peak Values		
Surge Category	Ring Wave*	Combination Wave**
B	6kV/0.5kA	6kV/3kA

Table 2-2 Standard Waveform Peak Values

Notes:

* stands for 0.5μs - 100 kHz Ring Wave

** stands for 1.2/50μs - 8/20μs Combination Wave

3 Mechanical Installation

3.1 Unpacking for Inspection

All the delivery items are shipped in one package, which includes the inverter, mounting bracket, four PE accessory bags and one zip file bag.

Before performing installation, check the product for any obvious damages or if the items on the delivery list are complete. Contact your supplier if any problem is found. The delivery list is as below:

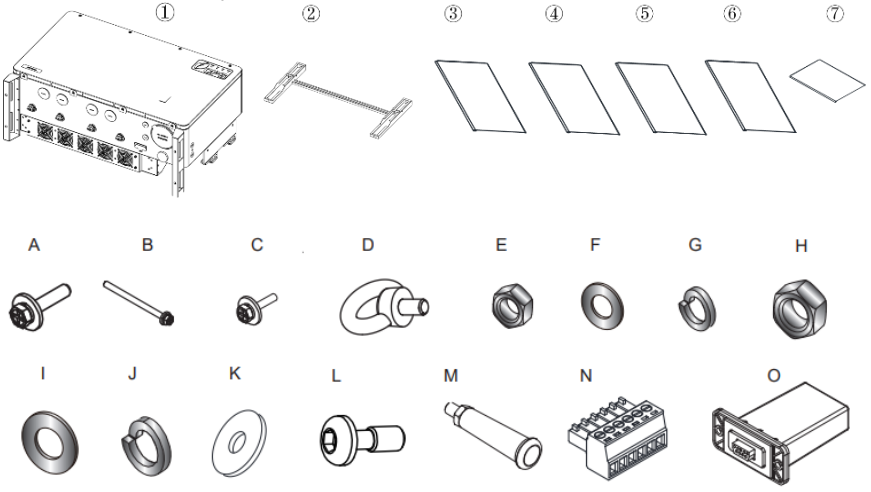


Figure 3-1 Delivery list

No.	Item names	QTY	Usages
1	Inverter	1	For PV inverter
2	Mounting bracket	1	Install inverter
3	PE accessory bag	1	Include accessories A-D
4	PE accessory bag	1	Include accessories E-K
5	PE accessory bag	1	Include accessories I-N
6	PE accessory bag	1	Include accessories O
7	PE zip file bag	1	Include quick guide, warranty card, certification
A	M10x50 Hex. combination screw	6	For mounting bracket.
B	M6x90 Hex.comb. screw	2	Fasten the inverter.
C	M6x16 Comb. screw	2	For grounding.
D	M10 Lifting eyebolt	2	Lift inverter by slope
E	M10 nut	6	For mounting bracket.
F	M10 flat gasket	6	For mounting bracket.

G	M10 spring washer	6	For mounting bracket.
H	M12 nut	6	For AC terminal block
I	M12 flat gasket	6	For AC terminal block
J	M12 spring washer	6	For AC terminal block
K	M12 big flat gasket	6	For AC terminal
L	M6x18 screw with plastic flat washer	1	Spare for front cover
M	Handle	2	Carry the inverter.
N	6-pin connector plug	1	For RS485 comm.
O	LINKIT	1	For communication.

Table 3-1 Accessory list

IMPORTANT!

The items on the delivery list above are for the standard configuration. The accessories provided may vary if optional parts are purchased.

3.2 Installation Precautions

- Check that the product environmental specifications (protection degree, operating temperature range, humidity and altitude, etc.) meet the requirements of the specific project location.
- Make sure that the power grid voltage is within the normal range of the Grid Code chosen.
- Ensure that you have been authorized by the local electricity supply authority to connect to the grid.
- Installation personnel must be qualified electricians or those who have received professional training.
- Wear and use proper PPE (personal protective equipment) during installation.
- Sufficient space must be provided to allow the inverter cooling system to operate normally.
- Install the inverter away from flammable and explosive substances.
- Make sure the installation condition doesn't exceed the temperature limits specified for the inverter, to prevent undesirable power loss.
- Do not install the inverter near an electromagnetic source which can compromise the normal operation of electronic equipment
- The PV Array is not grounded.
- The conduits entries meet the following:
  - ALL Conduit Entries must use water-tight fittings.
  - ALL Conduit Entries should use sealant around wires inside wire-compartment to prevent moisture ingress.
  - ALL Conduit Fittings should be metal to contain any thermal event in the wire-compartment – cause by moisture ingress.

For detailed specification ranges and limits, see Chapter 9, Technical Data.

3.3 Installation Requirements

3.3.1 Environment Requirements

The installation of the inverter shall meet the following environment requirements.

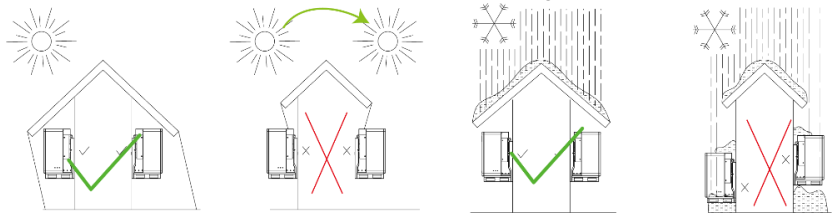


Figure 3-2 Environment requirements

NOTICE!

If the installation environment allows, avoiding direct sunlight from the inverter, avoiding direct rain and snow, can extend the life of the inverter. Direct sun install does not impact warranty.

3.3.2 Installation Modes

The inverter shall be installed following the modes as below:

a) If the location permits, install the inverter vertically.
b) If the inverter cannot be mounted vertically, it may be tilted backward by lower than 15 degrees from vertical direction.
c) Do not mount the inverter leaning forward.
d) Do not mount the inverter upside down.
e) Do not mount the inverter horizontally.

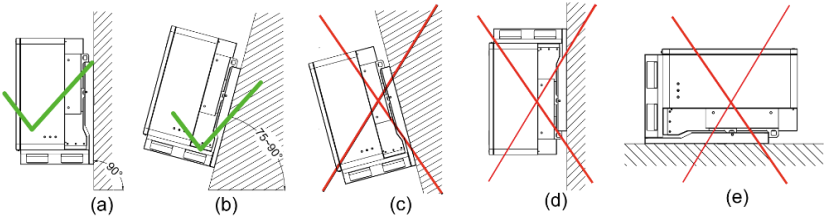


Figure 3-3 Installation modes

NOTICE!

Make sure that the mounting structure (bearing wall, rack, etc.) is capable to bear the weight of the inverter.

3.3.3 Space Requirements

The distances between the inverters or the surrounding objects should meet the following conditions:

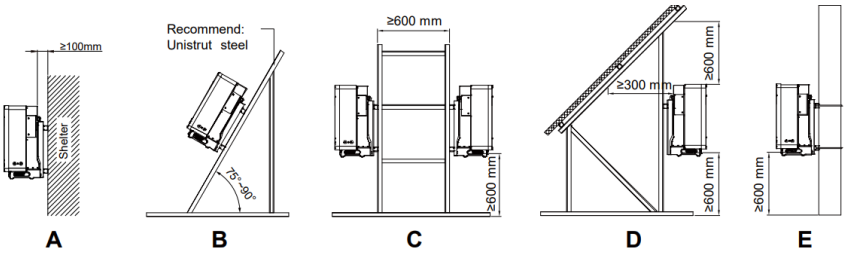


Figure 3-4 Space Requirements

A: Keep a proper distance between the inverter and the shelter to ensure good ventilation.

B: The inverter can be installed at an angle of 75° ~90° while its back shall not be shielded to ensure good ventilation.

C: Two inverters can be installed back to back, and proper distance shall be kept to ensure good ventilation.

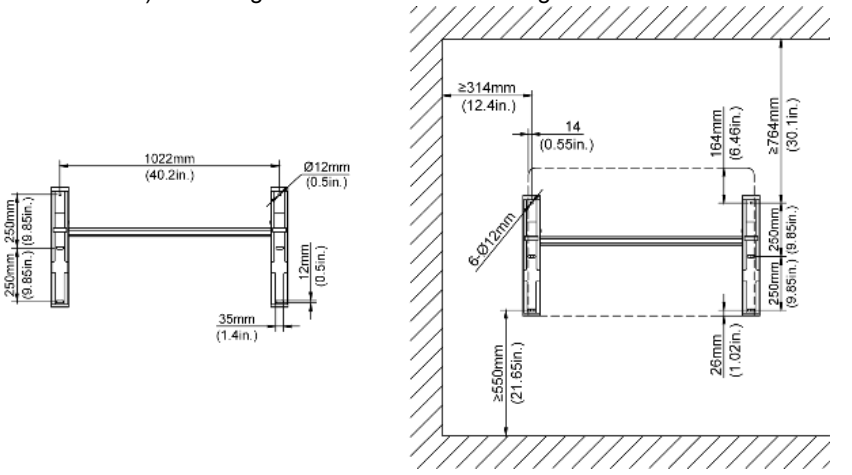
D: The inverter can be installed under the panel, while its back and top shall not be blocked to ensure good ventilation.

E: The inverter can be installed on a single column holding rod and shall be checked to confirm a secure installation.

3.4 Installation Procedures

3.4.1 Install the Inverter

1. Mark hole positions on the installation structure (shelter, steel rack, etc.) according to the size of the mounting brackets.



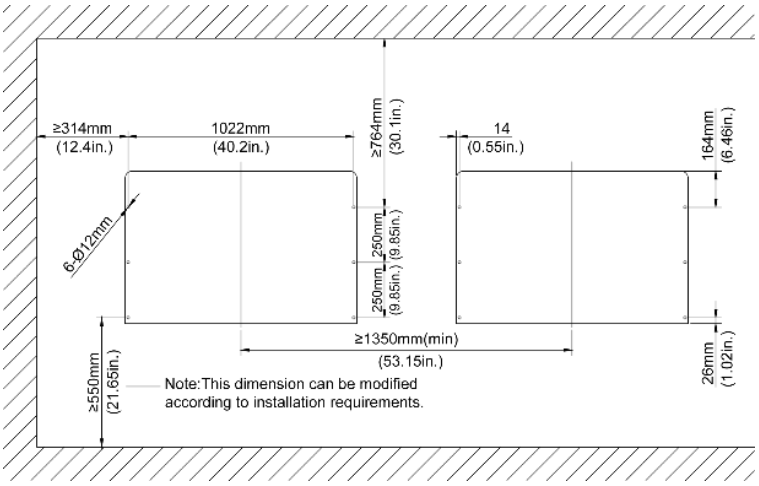


Figure 3-5 Hole positions of mounting bracket

2. Drill holes with a Φ12mm drill at the marked position, and then fasten the mounting bracket ① on the installation structure with six M10x50 hexagon combination screws ② included in the PE accessory bag. Tools required: 16mm hex socket wrench, torque: 12.5N.m,110 lbf-in.

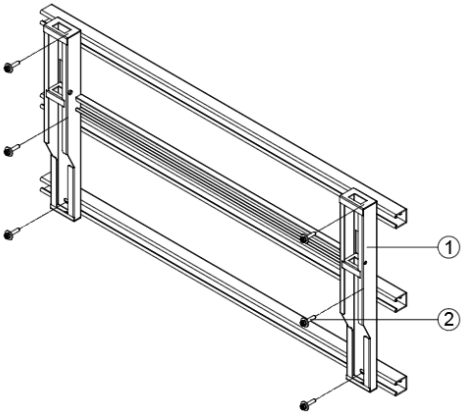


Figure 3-6 Fasten the mounting bracket

3. Position the inverter onto the mounting brackets by either of the two ways.
   A. Lift mounting: screw two M10 lifting eyebolts to the studs at the top of the inverter. Use sling rope or bar (inserted through both lifting eyebolts) to lift the inverter onto the mounting bracket. The minimum angle between the two sling ropes should be less than 90 degrees, as shown in Figure 3-7.

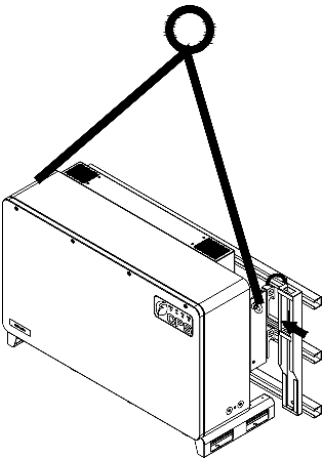


Figure 3-7 Lifting sling

B. Manual mounting: Three people are needed to properly lift the inverter by the handle positions marked in Figure 3-8, and mount the inverter onto the mounting bracket.

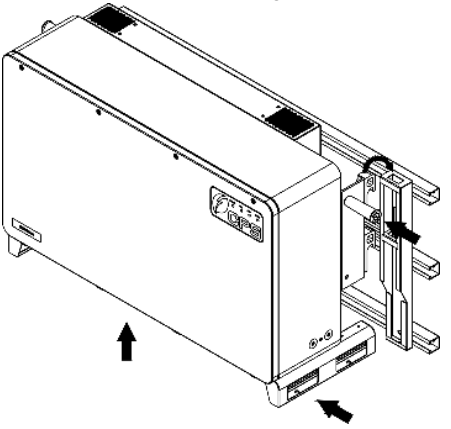


Figure 3-8 Handle positions

CAUTION!
The total weight of the inverter is approx. 119 kg (262.4 pounds). Ensure the mounting bracket is properly installed before hanging the inverter on the bracket. It is recommended to have at least 3 people to mount the inverter due to the weight of the equipment.

4. Use two M6X90 screws to fasten inverter on mounting bracket.
Tools required: #3 Philips head screwdriver, torque: 6 N.m, 53.1 lbf-in.

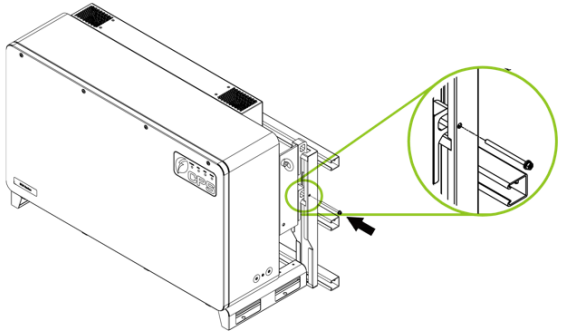


Figure 3-9 Fasten the inverter

3.4.2 Install the WIFI Module

1. Remove the two M4x10 fixing screws on the DB9 connector cover, as shown in Figure 3-10.

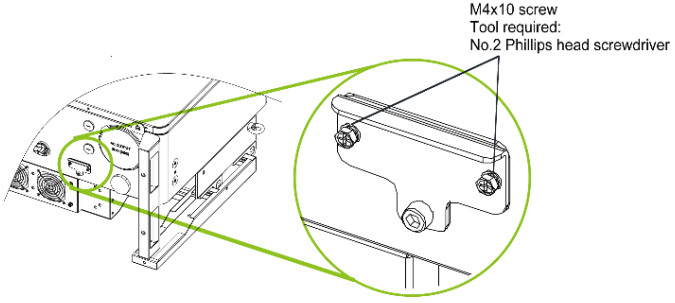


Figure 3-10 Expose the connector

2. Rotate the cover to expose the connector and then install the WIFI module with the two screws just removed. Pay attention to the control torque of 1.6 Nm, to ensure that the seal watertight.

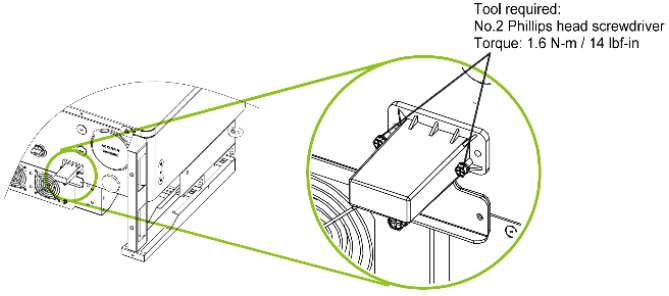


Figure 3-11 Install WIFI module

4 Electrical Connection

4.1 Schematic Diagram and Circuit Design

The electrical schematic diagrams of inverter are as shown in Fig. 4-1a and 4-1b.

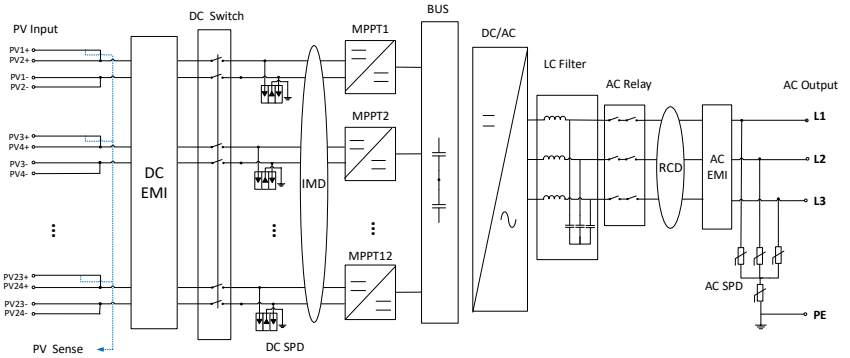


Figure 4-1a Schematic Diagram of the 24 Input Inverter

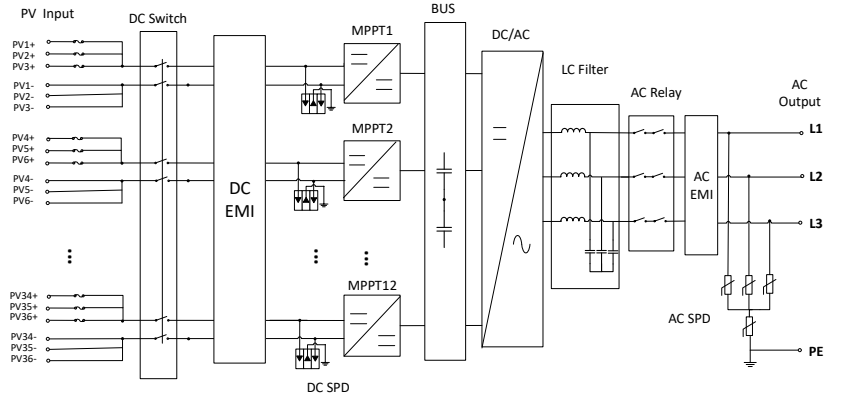


Figure 4-1b Schematic Diagram of the 36 Input Inverter

4.2 Cable Specifications

Cable	Type	Outer dia.	cross-sectional area
DC	Use 90 ℃ copper/*aluminum wire		10~4AWG
GND	Outdoor copper core wire	/	Phase wire diameter/2
AC	Outdoor three-core copper/ aluminum wire	⩽Ø92mm	Aluminum alloy cable. L1,L2,L3: 250kcmil~750kcmil PE: Phase wire diameter/2
Comm.	Communication cable UTP CAT-5e or Belden 3106A or equivalent *For Aluminum DC cable Bimetal ferrule shell be used.		

Table 4-1 Cable Specifications

4.3 Tools Required and Torque Values

No.	Tools	Usage	Torque value
1	No.2 Phillips head screwdriver	DC Cable	3 N.m, 26.5 lbf-in
2	18mm hex socket wrench	AC terminal block L1-L3	31 N.m, 274.4 lbf-in
3	10mm hex socket wrench	External grounding	6 N.m, 53 lbf-in
4	5mm flat screwdriver	Internal grounding bar	3 N.m for terminal A 5 N.m for terminal B
5	1.5mm flat screwdriver	RS485 comm. terminal	0.2 N.m, 1.8 lbf-in
6	Diagonal pliers	Cut cable	-
7	Wire stripping pliers	Remove jacket	-
8	Crimping pliers	Crimp terminal	-

Table 4-2 Tools required and torque values

4.4 Connect Interfaces and Connection Points

In the following text, you will find the connect interfaces, internal connection points, as well as their names, positions etc.

4.4.1 Connection Interfaces

The connection interfaces of inverter are as shown in figure 4-2.

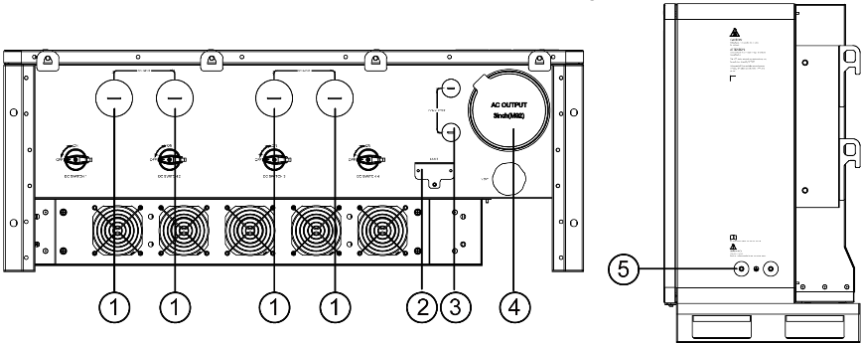


Figure 4-2 Connection interfaces

No.	Item name
1	Knockouts for DC input
2	LINKIT interface
3	Communication interface
4	Knockout for AC output
5	External GND connection point

Table 4-3 Connection interfaces

4.4.2 Internal Connection Points

The internal connection points of inverter are as shown in figure 4-3.

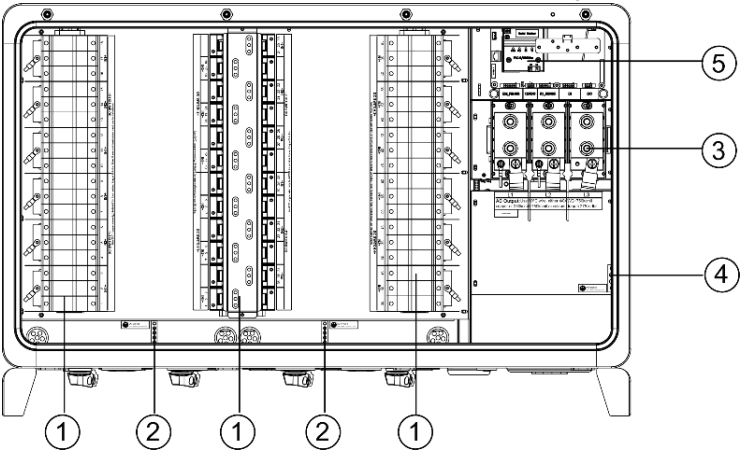


Figure 4-3a Internal connection points of 36 input inverter

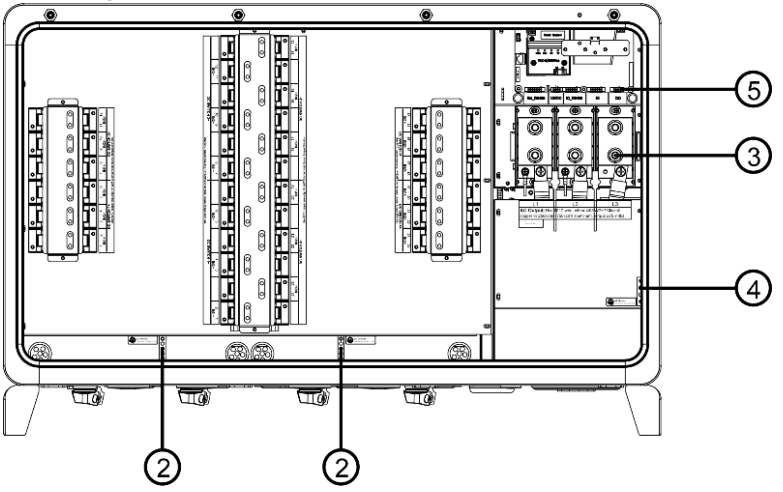


Figure 4-3b Internal connection points of 24 input inverter

No.	Item name
1	DC input fuse holder/terminal (NA for 24 input inverter)
2	DC Ground
3	AC output terminal block
4	AC Ground
5	Communication board

Table 4-4 Names of Internal connection points

4.5 Electrical Cable Connection

CAUTION!

The cables shall be connected in accordance with the National Electrical Code NFPA 70, CSA C22.1 and all other applicable local codes or jurisdictions.

WARNING!

This unit is not provided with a GFDI device. This inverter or charge controller must be used with an external GFDI device as required by the Article 690 of the National Electrical Code for the installation location.

First of all, use 5mm socket head screw wrench to remove the four screws on the front cover, and then lift the cover slightly to remove it.

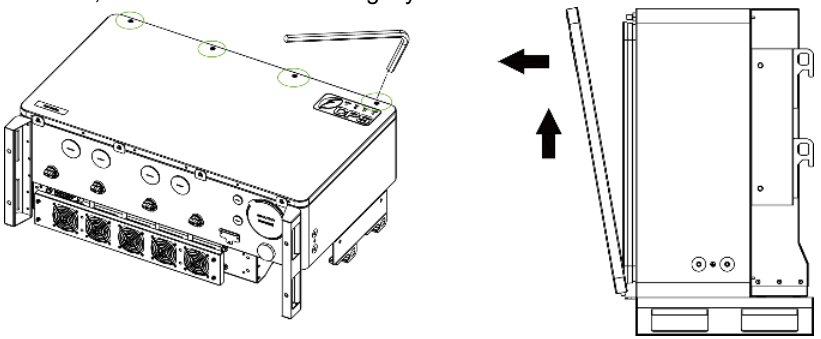


Figure 4-4 Remove the front cover

IMPORTANT!

It is important to use hand tools (e.g. socket wrench) instead of power drivers or other types of screw drivers.

4.5.1 Grounding

IMPORTANT!

The following wiring diagrams will take the 36 string input inverter as an example provided that there are no obvious differences in wiring.

There are two kinds of grounding method for this inverter. You can choose either one way as below:

a) Connect two internal DC grounding terminals (in the middle) and one AC grounding terminal (on right side) as shown in Figure 4-5, or

b) Connect the external grounding point as shown in Figure 4-6.

Figure 4-5 Internal DC and AC Ground Terminals

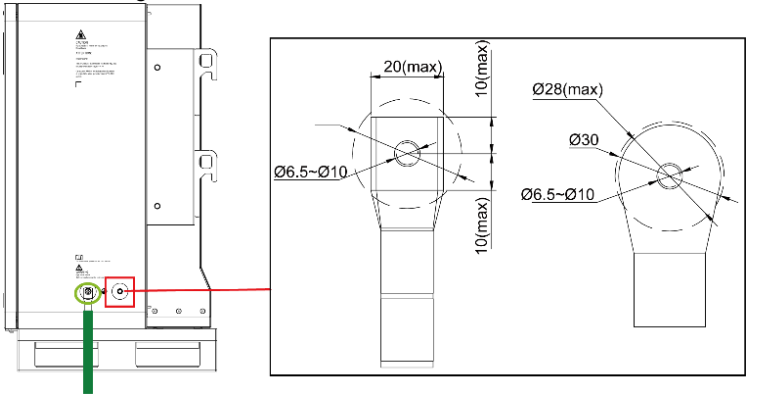


Figure 4-6 External Ground Cable Connection

IMPORTANT!

There are no differences on Internal DC and AC Ground Terminals, External Ground Cable Connections, and AC wiring terminals between 24 input inverter and 36 input inverter. Therefore, only the latter will be taken as an example in the context.

4.5.2 AC Wiring

1. Remove the watertight plugs from the AC output of the wiring box and install appropriately sized conduit and conduit fittings into the hole. Then route the cables through the conduit inside the wiring box.
2. A Circuit Ground should run with the AC Power cables and connected to the internal ground bus.

3. A separate Ground wire should bond the Inverter to the local ground connection for personnel safety. By bonding at this location is easy for operator to determine the inverter is safely grounded.
4. Connect the AC (L1, L2, L3) cables to the copper bus bar and connect the ground cable to the internal grounding terminal block.

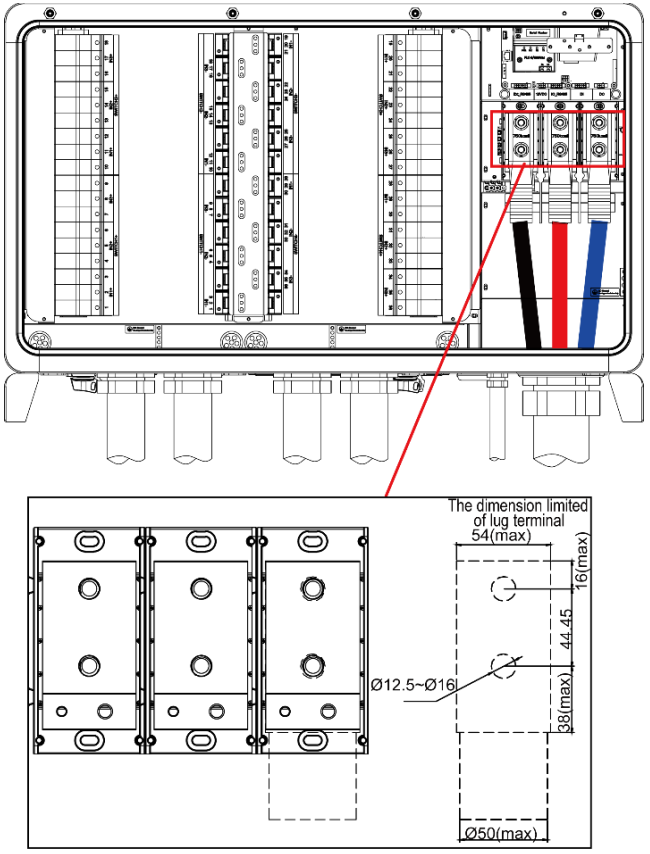


Figure 4-7 AC wiring terminals

When the output of the inverter is connected to the grid, an external AC circuit breaker or fused disconnect deviceis required to be installed to safely disconnect the inverter from the grid should an overcurrent occur. The minimum size breaker is determined by NEC calculations. The internal temperature of the AC Panel must be considered and appropriate derating applied to prevent nuisance tripping.

Inverter model	Max AC OCPD
CPS SCH275KTL-DO/US-800	300A

Table 4-5 Specification of AC OCPD

The inverter operates at 800VAC output. If another voltage/configuration is required, a transformer may be necessary.

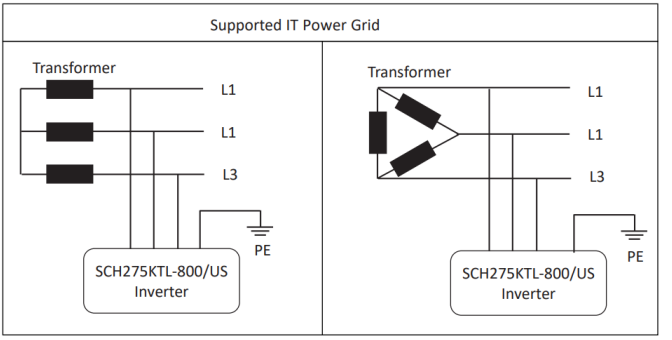


Figure 4-8 Supported IT power grid

Up to 20 inverters may be connected in parallel for use with a single transformer.

4.5.3 DC Wiring

4.5.3.1DC fuse configuration

The inverter is equipped with 20A DC fuses. Customers must verify that the appropriate fuses are installed depending on the actual configuration of PV strings.

- Each MPPT DC input from the PV that has more than 2 strings requires fuse protection. For MPPT DC input with 2 strings or less no DC fuse protection is required.
- The rated voltage of the fuse should be 1500VDC. ADLER series 1500VDC fuse are recommended.
- The rated current of the fuse is generally 1.56 × short circuit current from the PV strings, rounded up to the next available fuse size.

The following table lists the names, types and specifications of ADLER series fuses, which are within the rated voltage of PV panels.

Names	Standard 20A fuses	25A fuses	30A fuses	35A fuses
Types	A74	A74	A94	A94
Spec.	20A/1500V	25A/1500V	30A/1500V	35A/1500V

Table 4-6 DC Fuse selection

WARNING!

- Replace only with the same ratings and type of fuses.
- Different fuses or incorrectly sized fuses could result in equipment damages or unsafe working conditions.
- Any damage resulting from incompatible fuses is not covered by warranty.

CAUTION!

Disconnect supply before replacing fuses.

4.5.3.2DC Cable Connection

To ensure the optimum performance of the inverter, please read the following guidelines before performing any DC connections:

- Confirm the DC configuration and ensure that the maximum open circuit voltage of the PV modules is lower than 1500VDC under any conditions;
- Check the polarity before terminating the DC cables of PV strings according to the following steps, as shown in figure 4-9:
  - i. Use a multi-meter to measure the PV strings' cable ends and check the polarity.
  - ii. The positive (+) terminal of cable should match the positive (+) terminal of inverter's DC input.
  - iii. The negative (-) terminal of cable should match the negative (-) terminal of inverter's DC input.

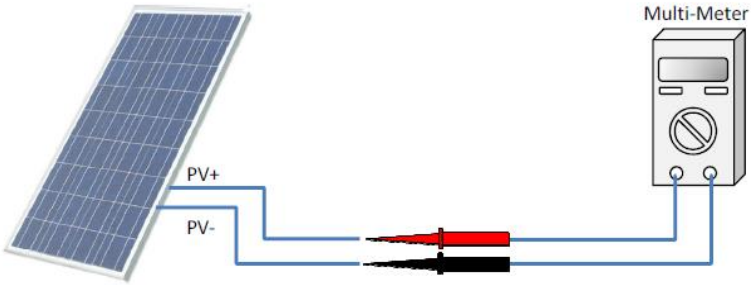


Figure 4-9 Polarity Check

NOTICE!

It is important to use a multi-meter to check the polarity of the DC input cables to avoid any risk of reverse polarity.

WARNING!

- A reversed string is extremely hazardous and will result in a blown fuse when the irradiation is high.
- The voltage across the blown fuse will be 2x Voc and could prevent proper fuse operation resulting in a fire.

Perform cable connection as per the following steps:

1. Remove the liquid-tight hole plugs from the DC input of the wiring box and install conduit and conduit fittings into the holes. Then route the cables through the conduit inside the wiring compartment.
2. Connect the DC cables to the fuse holders of 36 input inverter as shown in Figure 4-10a; or connect to the DC terminals of 24 input inverter as shown in Figure 4-10b, and then tighten the screws.

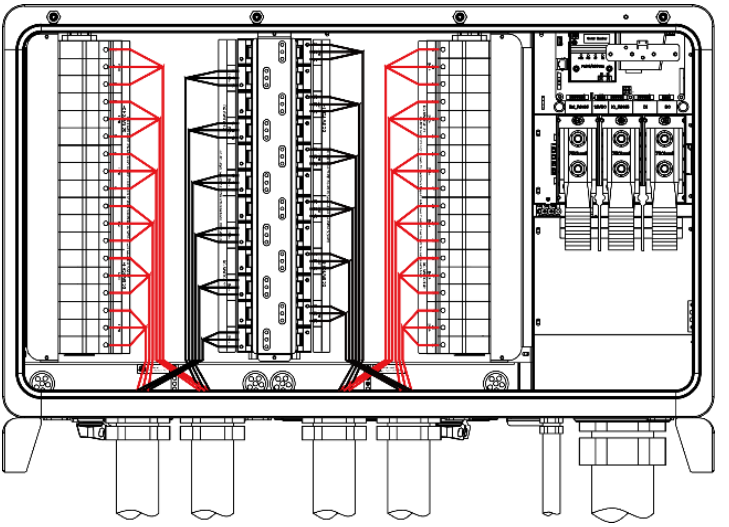


Figure 4-10a Connect the DC cable to fuse holder

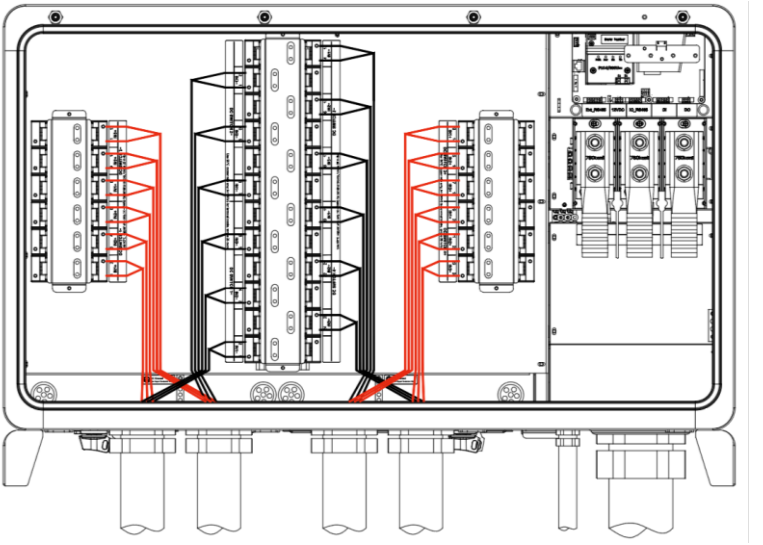


Figure 4-10b Connect the DC cable to DC terminal

NOTICE!

The use of ferrules is recommended for all stranded wire connections.

4.6 Communication Cable Connection

The inverter supports industry standard Modbus RS485 communication.

4.6.1 Communication Board

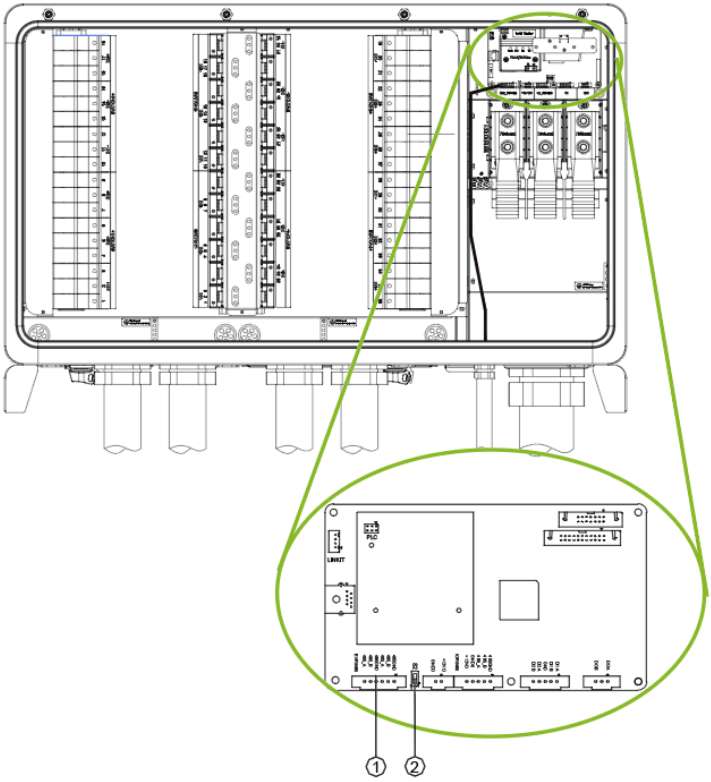


Figure 4-11 Communication Board

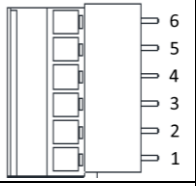
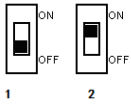
No.	Item names	Picture	Configuration
1	RS485 port 6-pin connector plug		6 - RS485_GND (Common) 5 - RS485_B 4 - RS485_A 3 - RS485_GND (Common) 2 - RS485_B 1 - RS485_A
2	S201 Selector switch (set terminal resistor)		OFF - Disable the terminal resistor ON - Enable the terminal resistor

Table 4-7 Communication board Interfaces

4.6.2 Communication Cable Connection

4.6.2.1 Cable Connection Methods

Choose the RS485 communication cables according to the following figures:

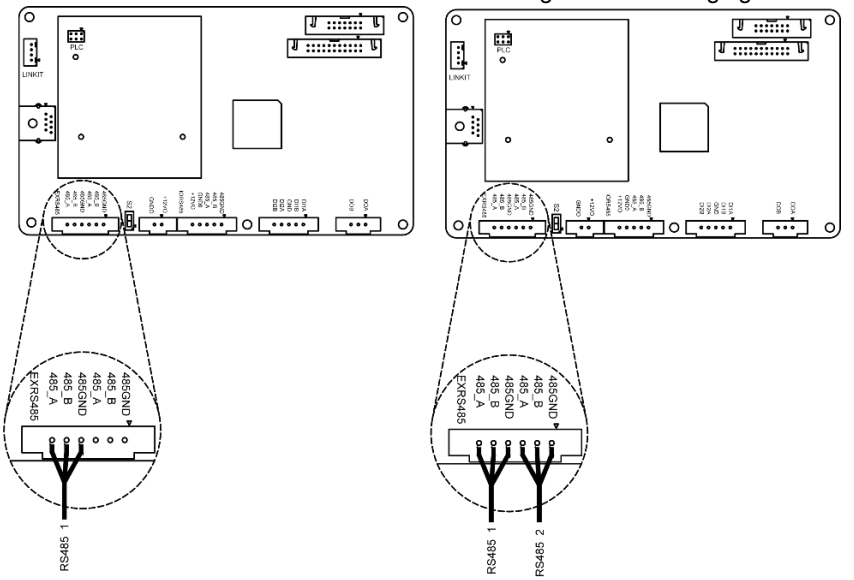


Figure 4-12 RS485 communication cable connection

It is recommended that industrial grade RS485 cable be used in lieu of unshielded twisted pair. Communication cable such as (CAT5) or Belden 3106A cable for RS485 5-pin connector is preferred.

4.6.2.2 RS485 Network Connection

When the inverters are monitored via the RS485 communication, a unique RS485 address for each inverter can be set up through the APP interface. Up to 32 inverters can be connected in a serial fashion in the RS485 communication network. Therefore, the daisy-chain topology (see Figure 5-4) is recommended for the RS485 network connection, which can minimize the noise and bus reflections. Other communication topologies, such as the star networks, are not recommended.

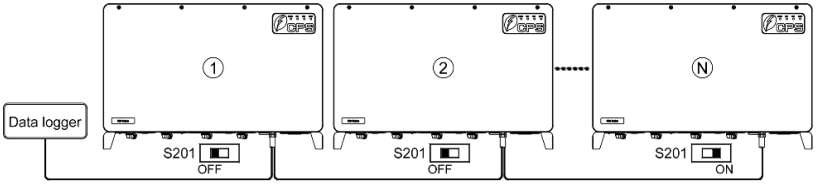


Figure 4-13 RS485 Network Connection

If there are multiple inverters in the RS485 network, the selector switch S201 of the last inverter in the daisy-chain should be in ON position, to enable the 120ohm terminal resistor. The selector switch S201 of all other inverters should be in the OFF position to disable the terminal resistor.

It is important to daisy chain the inverter RS485 connections to minimize noise and bus reflections. All RS485 connections must be terminated in a serial fashion and not to exceed 32 in total. Daisy Chain vs. multiple branch configuration is recommended.

WARNING!

- Make sure all DC and AC power has been disconnected before opening the wire box and ensure that hazardous high voltage and power has been discharged to avoid risk of electric shock.
- Wait at least 5 minutes before opening the wire box.

The detailed steps to perform the daisy chain connection are as follows:

1. Open the wire box.
2. Insert the communication cables into the wire box through the knockout holes at the bottom.
3. Connect the RS485 wires to the green Phoenix connector.
4. If the inverter is the **last** Modbus device in the daisy chain, make sure the Modbus termination switch S201 is in the ON position to enable Modbus termination; while all other switches shall be in the OFF position.
5. Connect the shield or drain wire continuously, but not in contact with RS (Common) or Enclosure Ground. Single-point ground the shield/drain wire.
6. Do not connect RS485 Common to ground.

After completing all the wiring steps, reinstall the front cover and press down to lock it. Finally, fasten the four screws on the front cover as shown in the figure.

Tools required: 5mm socket head screw wrench, torque:2.94N.m, 26lbf-in.

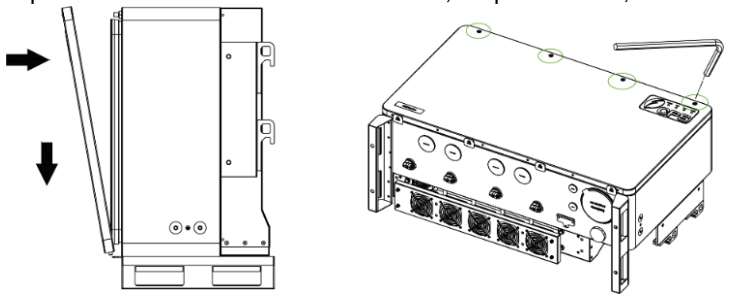


Figure 4-14 Re-cover the upper cover

IMPORTANT!

- It is important to use hand tools (e.g. socket wrench) instead of power drivers or other types of screw drivers.
- During installation, it is recommended the cover is in alignment with balanced force to avoid thread damage.
- Partially engage the screws into the threaded inserts before tightening.

5 Commissioning

WARNING!

Please follow the guidelines below before performing any on-grid operation to eliminate possible dangers.

5.1 Pre-commissioning Checks

5.1.1 Mechanical Installation

- Make sure all the mounting brackets are secure.
- Make sure all the screws have been tightened to the specified torque values.

5.1.2 Cable Connections

- Make sure all cables are connected to the right terminals.
- Perform appropriate cable management to avoid physical damages.
- The polarity of DC input cables must be correct.
- The DC Switch should be in the OFF position.

5.1.3 Electrical Check

- Make sure the AC circuit breaker is appropriately sized.
- Test and check that the AC voltage is within the normal operating range.
- Make sure the DC open circuit voltage of input strings is less than 1500V.

5.2 Commissioning Steps

Commissioning the inverter as follows:

1. Turn on the AC circuit breaker or fused switch disconnect.
2. Turn on the DC circuit breaker. (Start from step 3 if no circuit breakers is available.)
3. Switch the DC Switch to the ON position. When the energy supplied by the PV array is sufficient, the POWER indicator of inverter will light up. The inverter will then start up and enter self-check process.

6 APP Interface and Setting

6.1 APP Download

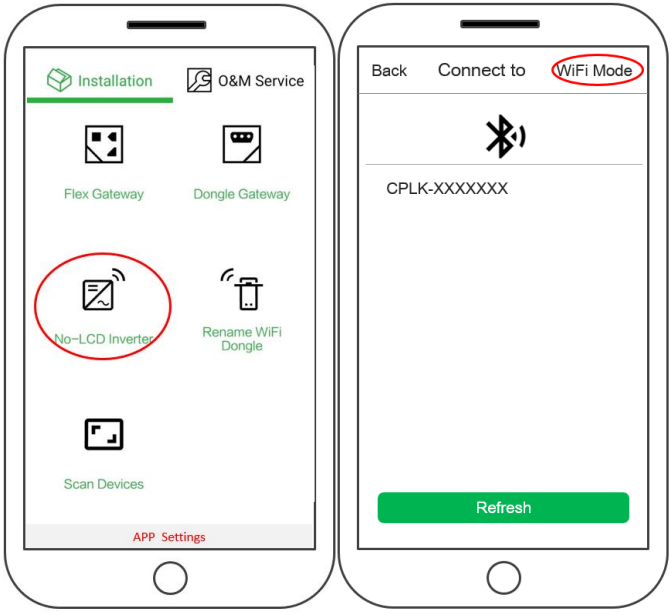
The inverter settings are accessed through the CPS Connect Pro application.

Users can download iOS version at Apple store or Android version in Google store or scan the QR code (Support Android 4.1 and IOS 9.0 or later).

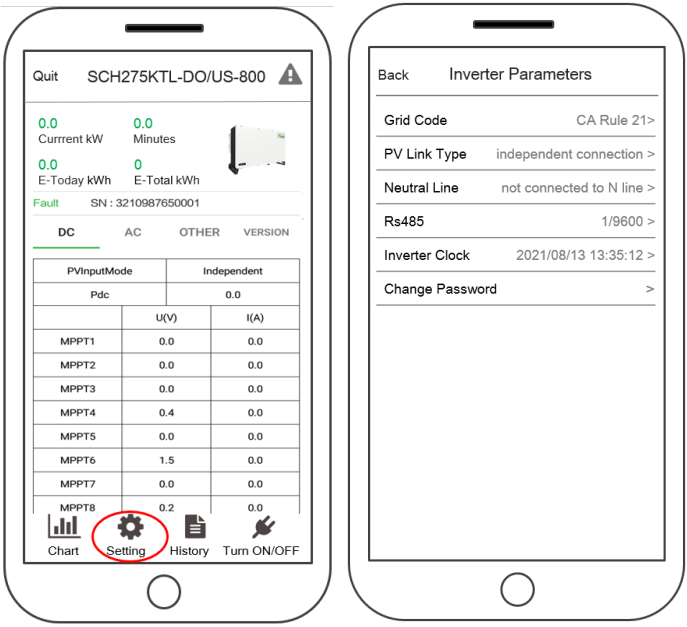
CPS Connect Pro

6.2 APP Setting

Once powered, the inverter will automatically create a wireless network that can be visible as an Access Point from the user communication devices (tablet, smartphone, etc.). Users can perform the following procedures to set the APP easily. First of all, open your Bluetooth function.



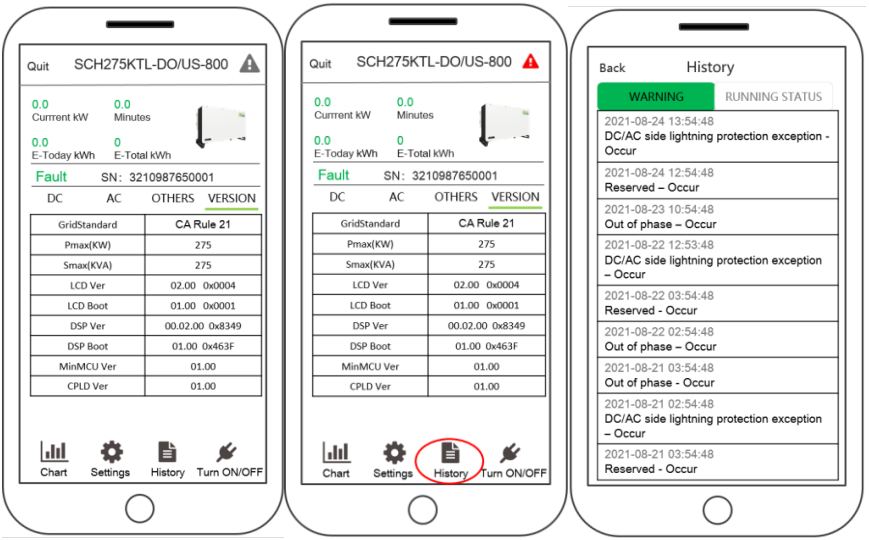
1. Open the **CPS Connect Pro** APP and then choose **NO-LCD Inverter** icon, the interface will go to WiFi Setting page.
2. Touch the wireless network named CPLK-XXXXXXX (X can be found on the LINKIT label), the interface will go to the main menu directly. Or you can choose the **WiFi Mode** tab in the top right corner to set WiFi and input the password “Password” (Capital P), the interface can also skip to main menu.



3. Touch the **Setting** icon and input the password “1111”, it will go to Setting interface.
4. Choose **Inverter Parameters** tab to set Grid Code, PV Link Type, Neutral line, RS485 and other parameters if necessary.
   - Grid Code: Choose the Grid Code according to the requirements of your local authority. 3 Standard codes are available – IEEE1547, Rule21, ISO-NE. Other SRDs can be implemented by manual configuration of settings.
   - PV Link Type: The working mode of the DC input connection and MPPT can only be configured as Independent.
   - Neutral Line: this inverter can only be applied in IT system, the neutral line connection is not supported.
   - RS485: Choose the communication data Modbus Address and Baud Rate.
   - Inverter Clock: Set the system clock.
   - Change Password: You can change the password according to the system prompt if necessary or as required

IMPORTANT!

- Please check with your local electricity supply company before selecting a Grid Code. If the inverter is operated with a wrong Grid Code, the electricity supply company may cancel the interconnection agreement.
- Placing the inverter into operation before the overall system complies with the national rules and safety regulations of the application is not permitted.



5. When the device screen shows the normal operation status and the RUN light on the LED panel is illuminated, it indicates that the grid connection and power generation are successful. You can now browse through the real-time data in the APP now.
6. If the inverter fails to operate normally, the FAULT light will illuminate and the fault information will be shown on the interface. You can touch the **History** icon to check the detailed fault information. Troubleshoot related problems and restart. Contact our after-sale department if necessary.

6.3 Structure Tree of App Interface

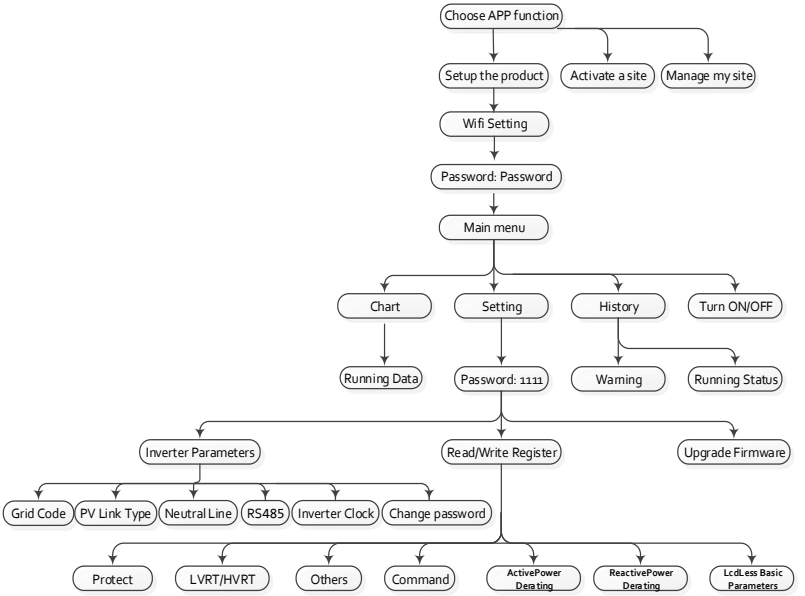
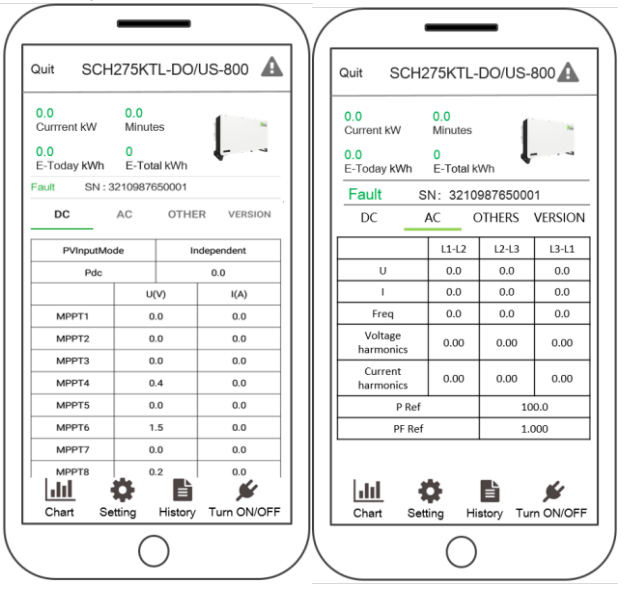


Figure 6-1 Structure tree of App Interface

6.4 Main Menu

In the Main interface, you can access the DC, AC, OTHER and VERSION information.



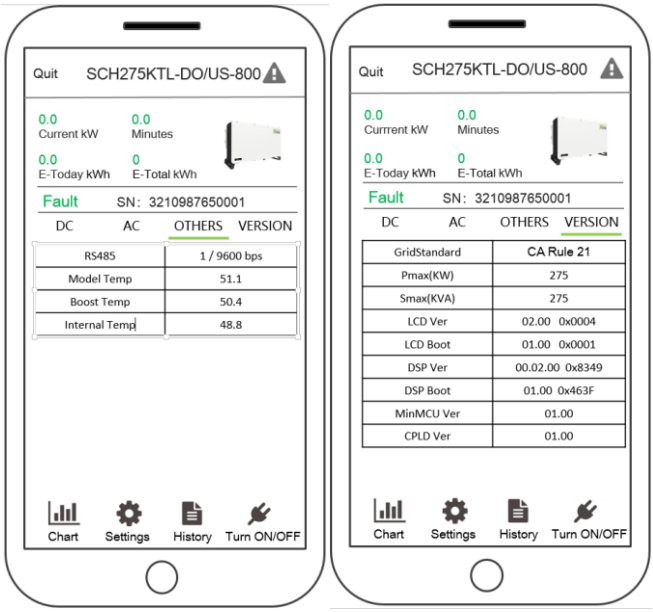


Figure 6-2 Main information on Main Interface

In addition, you can see four submenus: Chart, Setting, History and Turn ON/OFF.

6.4.1 Chart

In the chart sub-menu, you can view the power generation situation at different times, such as Current, Today and Total. These data can also be displayed in Day, Month, Year, shown as below in Figure 6-3.

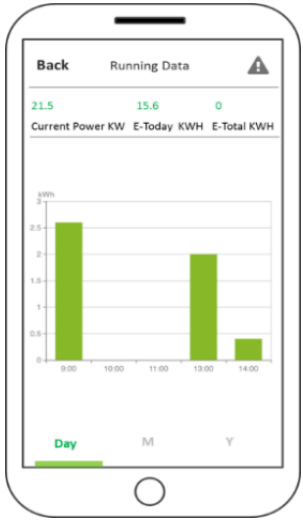


Figure 6-3 power generation situation

6.4.2 Setting

Touch the **Setting** icon and input the password “1111”, you will go to the setting interface.

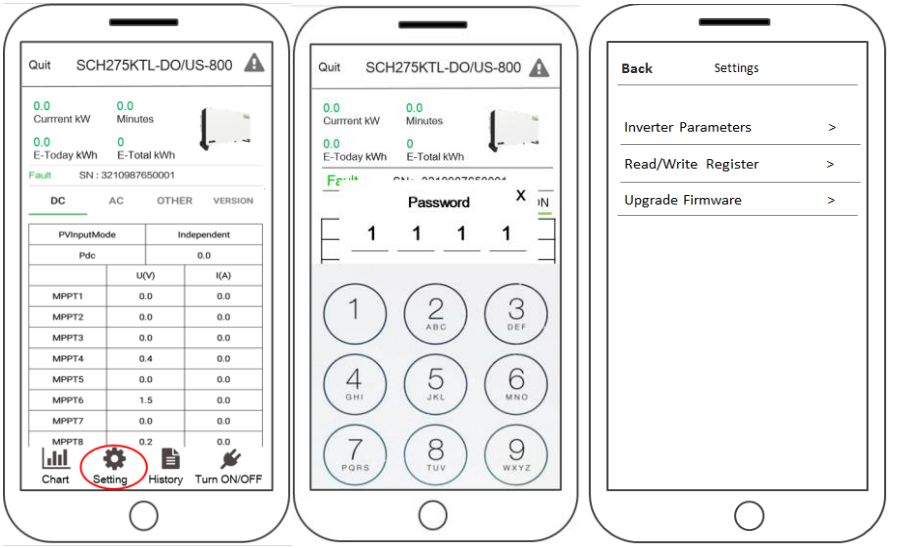


Figure 6-4 Setting interface

It’s possible to access three submenus on the setting interface: Inverter Parameters, Read/Write Register and Upgrade Firmware.

6.4.2.1 Inverter Parameters

Touch the Inverter Parameters tab, you can set the following parameters as required.

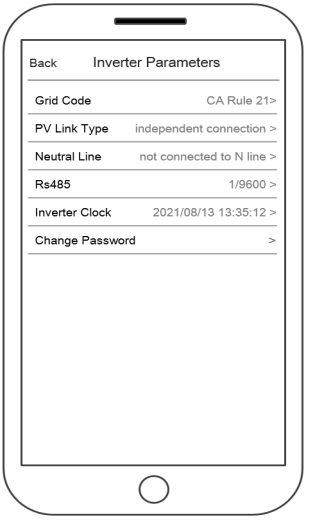


Figure 6-5 Inverter Parameters

IMPORTANT!

Please check with you local electric supply company before selecting a grid code. If the inverter operates with a wrong grid code, the electric supply company may cancel the interconnection agreement.

6.4.2.2 Read/Write Register

In the Read/Write Register interface, you can find the following sub-menus:

- Protect
- LVRT/HVRT
- Others
- Command
- ActivePowerDerating
- ReactivePowerDerating
- LcdLess Basic Parameters

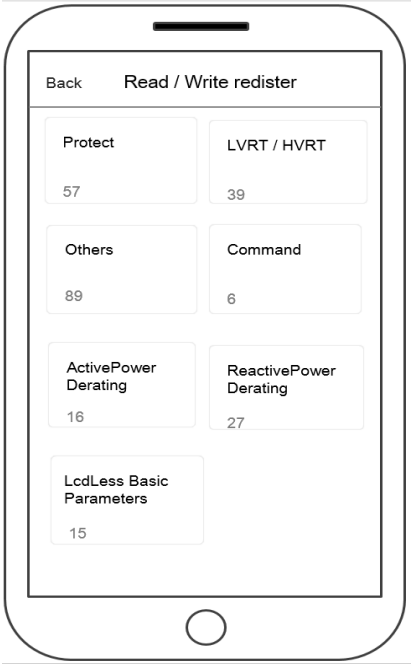


Figure 6-6 Read/Write Register

6.4.2.2.1 Protect

The Protect interface displays the protect parameters of the AC grid voltage, frequency and recovery, etc. In addition, you can find and set the protection levels of over voltage, under voltage, over frequency and under frequency.

Figure 6-7 Protection Parameters

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
Grid Over Voltage Protection						
GridVoltMax1	Threshold Level 1 Max. grid voltage	{100.00%,135.00%}	110.00%	110.00%	110.00%	%
VoltMaxTripT1	Trip Time Level 1 Max. grid voltage	{0, 655}	2.00	12.50	2	Secs
GridVoltMax1En	Level 1 Max. grid voltage protection	{Disable, Enable}	Enable	Enable	Enable	
GridVoltMax2	Threshold Level 2 Max. grid voltage	{100.00%,135.00%}	120.00%	120.00%	120.00%	%
VoltMaxTripT2	Trip Time Level 2 Max. grid trip voltage	{0, 655}	0.16	0.16	0.16	Secs
GridVoltMax2En	Level 2 Max. grid voltage protection	{Disable, Enable}	Enable	Enable	Enable	
GridVoltMax3	Threshold Level 3 Max. grid voltage	{100.00%,135.00%}	120.00%	120.00%	120.00%	%
VoltMaxTripT3	Trip Time Level 3 Max. grid trip voltage	{0, 655}	0.16	0.16	0.16	Secs
GridVoltMax3En	Level 3 Max. grid voltage protection	{Disable, Enable}	Disable	Disable	Disable	
Grid Under Voltage Protection						
GridVoltMin1	Threshold Level 1 Min. grid voltage	{20.00%,100.00}	70.00%	88.00%	88.00%	%
VoltMinTripT1	Trip Time Level 1 Min. grid trip voltage	{0, 655}	10.00	20.50	2	Secs
GridVoltMin1En	Level 1 Min. grid voltage protection	{Disable, Enable }	Enable	Enable	Enable	
GridVoltMin2	Threshold Level 2 Min. grid voltage	{20.00%,100.00%}	45.00%	70.00%	50.00%	%
VoltMinTripT2	Trip Time Level 2 Min. grid trip voltage	{0, 655}	0.16	10.50	1.1	Secs
GridVoltMin2En	Level 2 Min. grid voltage protection	{Disable, Enable }	Enable	Enable	Enable	
GridVoltMin3	Threshold Level 3 Min. grid voltage	{20.00%,100.00%}	45.00%	50.00%	50.00%	%
VoltMinTripT3	Trip Time Level 3 Min. grid trip voltage	{0, 655}	0.16	1.50	1.1	Secs
GridVoltMin3En	Level 3 Min. grid voltage protection	{Disable, Enable }	Disable	Enable	Disable	
Grid Over Frequency Protection						
GridFrqMax1	Threshold Level 1 Max. grid frequency	{60, 66}	61.20	60.5	61.2	Hz
FrqMaxTripT1	Trip time of Level 1 Max. grid frequency	{0, 655}	299.50	299.50	299.50	Secs
GridFrqMax1En	Level 1 Max. grid frequency protection	{Disable, Enable}	Enable	Enable	Enable	
GridFrqMax2	Threshold Level 2 Max. grid frequency	{60, 66}	62	62	62	Hz
FrqMaxTripT2	Trip time of Level 2 Max. grid frequency	{0, 655}}	0.16	0.16	0.16	Secs

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
GridFrqMax2En	Level 2 Max. grid frequency protection	{Disable, Enable}	Enable	Enable	Enable	
GridF.Max3	Threshold Level 3 Max. grid frequency	{60, 66}	62	62	62	Hz
FrqMaxTripT3	Trip time of Level 3 Max. grid frequency	{0, 655}	0.16	0.16	0.16	Secs
GridFrqMax3En	Level 3 Max. grid frequency protection	{Disable, Enable}	Disable	Disable	Disable	
Grid Under Frequency Protection						
GridFrqMin1	Threshold Level 1 Min. grid frequency	{48, 60}	58.5	58.5	58.5	Hz
FrqMinTripT1	Trip time of Level 1 Min. grid frequency	{0, 655}	299.50	299.50	299.50	Secs
GridFrqMin1 En	Level 1 Min. grid frequency protection	{Disable, Enable}	Enable	Enable	Enable	
GridFrqMin2	Threshold Level 2 Min. grid frequency	{48, 60}	56.50	57	56.5	Hz
FrqMinTripT2	Trip time of Level 2 Min. grid frequency	{0, 655}	0.16	0.16	0.16	Secs
GridFrqMin2 En	Level 2 Min. grid frequency protection	{Disable, Enable}	Enable	Enable	Enable	
GridFrqMin3	Threshold Level 3 Min. grid frequency	{48, 60}	56.50	57	56.5	Hz
FrqMinTripT3	Trip time of Level 3 Min. grid frequency	{0, 655}	0.16	0.16	0.16	Secs
GridFrqMin3 En	Level 3 Min. grid frequency protection	{Disable, Enable}	Disable	Disable	Disable	
Voltage and Frequency Protection Recovery						
VoltMaxRecovery	Recovery Max threshold grid voltage protection	{80.00%, 135.00%}	108.00%	108.00%	108.00%	%
VoltMinRecovery	Recovery Min threshold. grid voltage protection	{20.00%,100.00%}	90.00%	90.00%	90.00%	%
VolRecoveryT	Recovery time of grid voltage protection	{0, 655}	300	300	300	Secs
FrqMaxRecovery	Recovery Max threshold grid Frequency protection	{54, 66}	60.3	60.4	61.00	Hz
FrqMinRecovery	Recovery Min threshold. grid Frequency protection	{48, 60}	58.6	58.6	58.8	Hz
FrqRecoveryT	Recovery time of grid frequency protection	{0, 655}	300	300	300	Secs
Moving Average Parameters						
VoltMaxMovAvg	Threshold max Voltage move average	{100.00%,135.00%}	110.00%	110.00%	110.00%	%
MaxTripVMovAvg T	Trip time of max. voltage move average	{0, 655}	600	600	600	Secs

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
VoltMaxMovAvgEn	max voltage move average enable	{Disable, Enable}	Disable	Disable	Disable	
VoltMinMovAvg	Threshold min voltage move average	{80.00%, 100.00%}	88.00%	87.99%	88.00%	%
MinTripVMovAvgT	Trip time of min voltage move average	{0, 655}	600	600	600	Secs
VoltMinMovAvgEn	min voltage move average enable	{Disable, Enable}	Disable	Disable	Disable	
Voltage Unbalance						
GridVoltUnbalance	Threshold grid voltage unbalance	{0.01%, 10%}	10%	10%	10%	%
GridVoltUnbalanceEn	grid voltage unbalance enable	{Disable, Enable}	Enable	Enable	Enable	
PhaseLose and Phase-PE parameters						
PhaseLoseCoeff	Phase lose protection trigger value	{0.5%,30.0%}	3.0%	3.0%	3.0%	%
PhaseLoseRcvCoeff	Phase lose protection recovery value	{0.5%,30.0%}	2.0%	2.0%	2.0%	%
PhaseLoseVUnbalance	PhaseLose Voltage Unbalance	{0.1%,10.0%}	10.0%	10.0%	10.0%	%
PhasLoseCoeffEnable	Phase lose protection	{Disable, Enable}	Disable	Disable	Disable	
Phase-PETripVolt	Phase-PE Trip Voltage	{0.01,100.00}	45%	45%	45%	%
Phase-PERcvVolt	Phase-PE grid recovery	{0.01,100.00}	35%	35%	35%	%
Phase-PEEnable	Enable Phase-PE protection	{Disable, Enable}	Disable	Disable	Disable	

Table 6-1 Protection Parameters (IEEE1547 2018, Rule21 and ISO-NE)

6.4.2.2.2 LVRT/HVRT

The LVRT/HVRT interface is used to set the LVRT (Low voltage ride through) and HVRT (High voltage ride through) parameters as shown in the following interfaces:

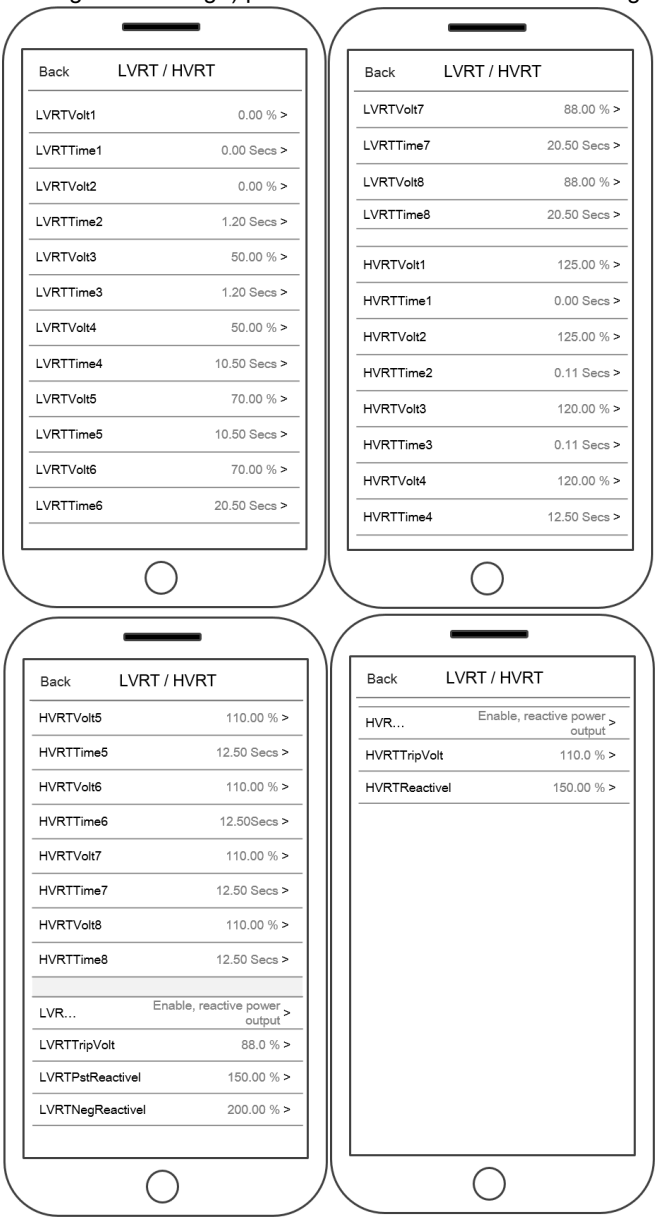


Figure 6-8 LVRT/HVRT interface

You can also see the LVRT Curve in figure 6-9 and HVRT Curve in figure 6-10.

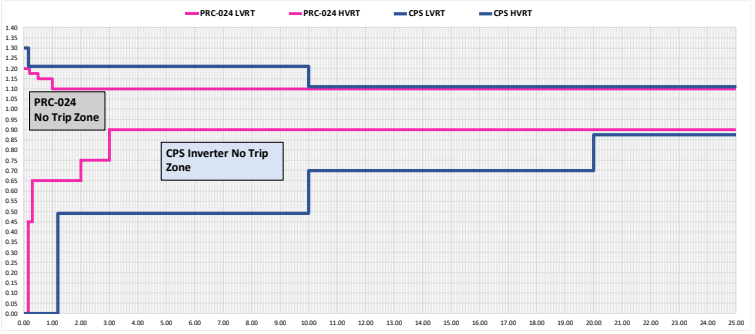


Figure 6-9 LVRT Curve

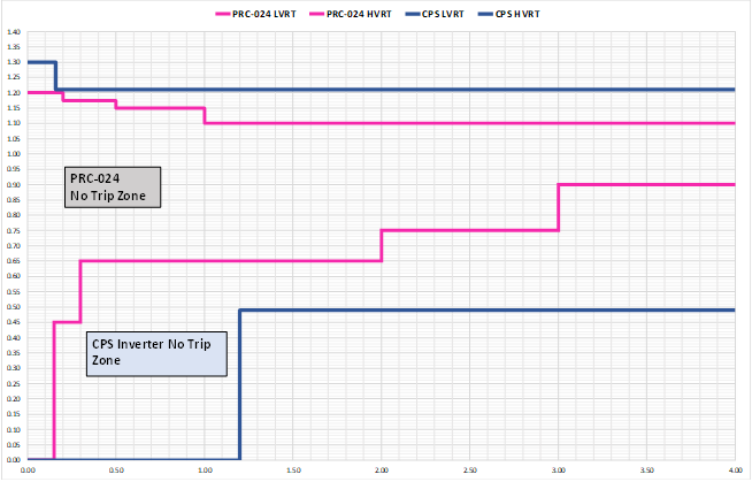


Figure 6-10 HVRT Curve

In addition, the table listed below can provide detailed parameter information for you.

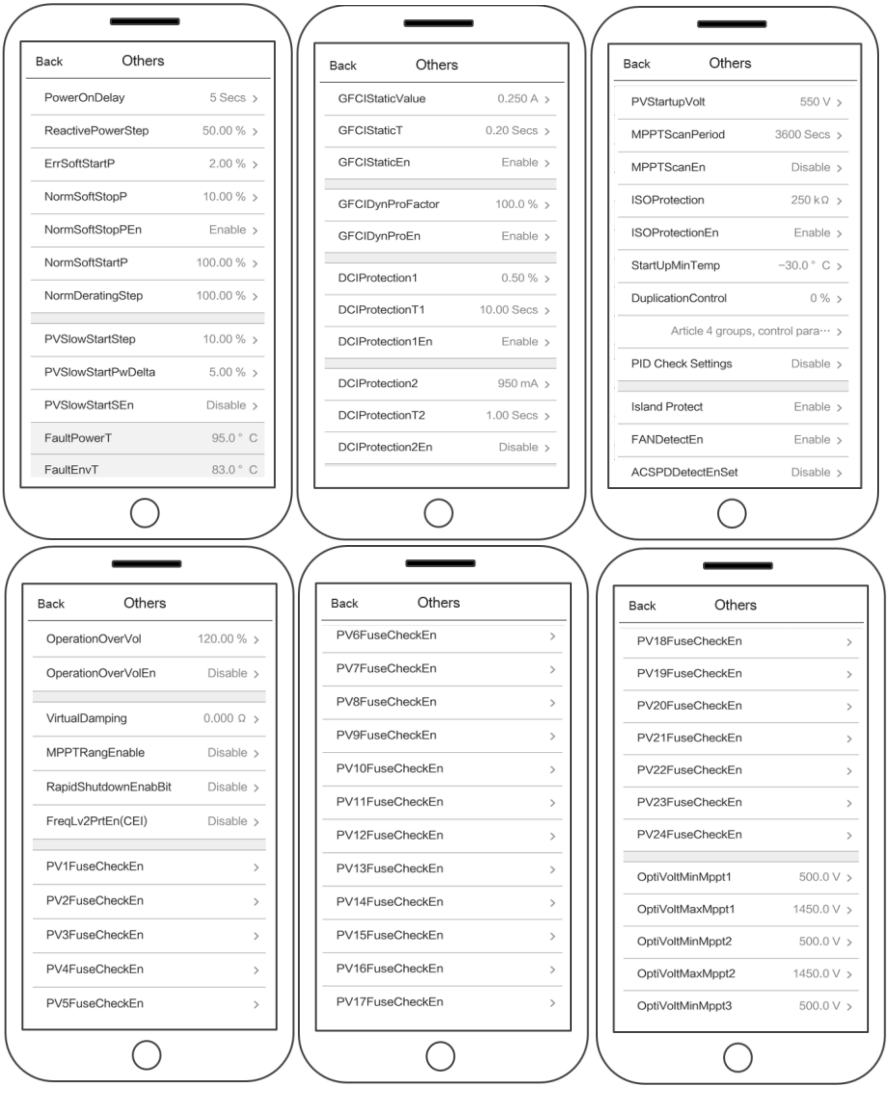
Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
LVRT						
LVRTVolt (1,2)	Threshold LVRT (1st or 2nd point)	{0%, 100%} {0%, 100%}	0% 49%	0% 49%	0% 49%	%
LVRTTime (1,2)	Time of LVRT (1st or 2nd point)	{0, 655} {0, 655}	0 1.2	0 1.2	0 1.2	Secs
LVRTVolt (3,4)	Threshold LVRT (3rd or 4th point)	{0%, 100%} {0%, 100%}	49% 70%	49% 70%	49% 65%	%
LVRTTime (3,4)	Time of LVRT (3rd or 4th point)	{0, 655} {0, 655}	1.210	1.2 10.5	1.2 3.5	Secs
LVRTVolt (5,6)	Threshold LVRT (5th or 6th point)	{0%, 100%} {0%, 100%}	70% 87.5%	70% 87.5%	65% 87.5%	%

LVRTTime (5,6)	Time of LVRT (5th or 6th point)	{0, 655} {0, 655}	9.50 20.50	10.5 20.5	3.5 5.5	Secs
LVRTVolt (7,8)	Threshold of LVRT (7th or 8th point)	{0%, 100%} {0%, 100%}	87.5% 88%	87.5% 88%	87.5% 88%	%
LVRTTime (7,8)	Time of LVRT (7th or 8th point)	{0, 655} {0, 655}	20.5 Continues	20.5 Continuous	5.5 Continues	Secs
HVRT						
HVRTVolt (1,2)	Threshold of HVRT (1st or 2nd point)	{100%, 135%} {100%, 135%}	130% 121%	130% 121%	130% 121%	%
HVRTTime (1,2)	Time of Level HVRT (1st or 2nd point)	{0, 655} {0, 655}	0 0.16	0 0.16	0 0	Secs
HVRTVolt (3,4)	Threshold of HVRT (3rd or 4th point)	{100%, 135%} {100%, 135%}	121% 111%	121% 111%	121% 111%	%
HVRTTime (3,4)	Time of Level HVRT (3rd or 4th point)	{0, 655} {0, 655}	0.16 10	0.16 10	06	Secs
HVRTVolt (5,6)	Threshold of HVRT (5th or 6th point)	{100%, 135%} {100%, 135%}	111% 100%	111% 100%	111% 100%	%
HVRTTime (5,6)	Time of Level HVRT (5th or 6th point)	{0, 655} {0, 655}	continues	continues	continues	Secs
HVRTVolt (7,8)	Threshold of HVRT (7th or 8th point)	{100%, 135%} {100%, 135%}	111% 100%	111% 100%	111% 100%	%
HVRTTime (7,8)	Time of Level HVRT (7th or 8th point)	{0, 655} {0, 655}	continues	continues	continues	Secs
LVRT Setting						
LVRTModeSetting	LVRT mode setting	{Disable; Enable reactive power output; Enable no reactive power output; Enable, active power output }	Enable, reactive power output	Enable, reactive power output	Enable, reactive power output	
LVRTTripVolt	Trigger Voltage of LVRT	{70%, 100%}	88%	88%	88%	%
LVRTPstReactiveI	Coefficient of LVRT positive current	{0%, 300%}	150%	150%	150%	%
LVRTNegReactiveI	Coefficient of LVRT negative current	{0%, 300%}	200%	200%	200%	%
HVRT Setting						
HVRTModeSetting	HVRT mode setting	{Disable; Enable reactive power output; Enable no reactive power output; Enable, active power output }	Enable, no reactive power output	Enable, no reactive power output	Enable, no reactive power output	
HVRTTripVolt	Trigger Voltage of HVRT	{110%,135%}	111%	111%	111%	%
HVRTReactiveI	Coefficient of HVRT reactive current	{0%,300%}	150%	150%	150%	%

Table 6-2 LVRT and HVRT Parameters (IEEE1547 2018, Rule21 and ISO-NE)

6.4.2.2.3 Others

In the others interface, you can find following common parameters shown as below.



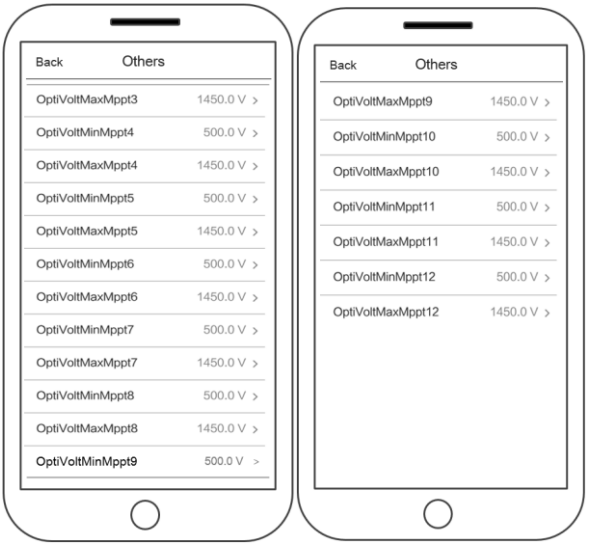


Figure 6-11 Others interface

In addition, the table listed below can provide detailed parameter information for you.

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
PowerOnDelay	Startup delay time	{0,1200}	5	5	5	Secs
ReactivePowerStep	Reactive Power Step	{0.01%,655.35%}	50.00%	50.00%	50.00%	
ErrSoftStartP	Pwr Ramp after Fault	{0.01%,100%}	0.16%	2.00%	0.16%	%
NomSoftStopP	Normal Stop Pwr Rate	{0.01%,100%}	6.00%	10.00%	10.00%	%
NomSoftStopPEn	Normal Stop Pwr Rate Enable	{Disable, Enable}	Enable	Enable	Enable	
NomSoftStartP	Normal Start Pwr Rate	{0.01%,100%}	4.00%	100.00%	2.00%	%
NomDeratingStep	Normal Pwr Derating Step	{0.01%,100%}	6.00%	100.00%	6.00%	%
PVSlowStartStep	PV Slow Start Step	{0.01%,100%}	10%	10%	10%	%
PVSlowStartPwDelta	PV Slow Start Pwr slope	{0.01%,100%}	5.00%	5.00%	5.00%	%
PVSlowStartSEn	PV Slow Start Setting	{Disable, Enable}	Disable	Disable	Disable	
FaultPowerT	IGBT Fault Temp	{94.0}	95.0	95.0	95.0	℃
FaultEnvT	Enclosure Fault Temp	{78.5}	83.0	83.0	83.0	℃
GFCIStaticValue	Static Threshold Leakage current	{0.100,5.000}	2.500	2.500	2.500	A
GFCIStaticT	Static Threshold Leakage Time	{0,655}	0.20	0.20	0.20	Secs
GFCIStaticEn	Enable Static Threshold Leakage current	{Disable, Enable}	Enable	Enable	Enable	
GFCIDynPro Factor	Threshold dynamic coefficient Leakage current	{0.0%,200%}	100%	100%	100%	%

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
GFCIDynProEn	Enable Dynamical ground fault circuit interrupter	{Disable, Enable}	Disable	Disable	Disable	
DCIProtection1	Max. DCI value 1	{0.1%,5.00%}	0.50%	0.50%	0.50%	%
DCIProtectionT1	Trip time 1 of DCI value	{0.00,120.00}	10.00	10.00	60.00	Secs
DCIProtection1En	Enable Maximum DCI value 1	{Disable, Enable}	Enable	Enable	Enable	
DCIProtection2	Max. DCI value 2	{5,5000}	950	950	950	mA
DCIProtectionT2	Trip time 2 of DCI value	{0.00,120.00}	1.00	1.00	1.00	Secs
DCIProtection2En	Enable Max. DCI value 2	{Disable, Enable}	Disable	Disable	Disable	
PVStartupVolt	PV start-up voltage	(500, 700)	550	550	550	V
MPPTScanPeriod	MPPT Scan Cycle	{300,5400}	3600	3600	3600	Secs
MPPTScanEn	Enable MPPT Scan	{Disable, Enable}	Disable	Disable	Disable	
ISOProtection	Minimum insulation resistance	{1, 5000}	100	100	100	kΩ
ISOProtectionEn	Insulation detection	{Disable, Enable}	Enable	Enable	Enable	
StartUpMinTemp	Min Startup Temperature	{-35℃, -20℃}	-30	-30	-30	℃
DuplicationControl	Duplication Control	{0%,100%}	0%	0%	0%	%
PID Check Settings	PID Check Setting	{Disable, Enable}	Disable	Disable	Disable	
Island Protect	anti-Island protection	{Disable, Enable}	Enable	Enable	Enable	
FANDetectEn	fans detection	{Disable, Enable}	Enable	Enable	Enable	
ACSPDDetectEnSet	AC surge protection device test	{Disable, Enable}	Disable	Disable	Disable	
OperationOverVol	Operation over voltage protect value	{100%,135%}	120%	120%	120%	%
OperationOverVolDectEn	Over voltage detection	{Disable, Enable}	Disable	Disable	Disable	
VirtualDamping	Resonance damping coefficient	{0.000, 5.000}	0.000	0.000	0.000	Ω
MPPTRangEnable	Enable MPPT	{Disable, Enable}	Disable	Disable	Disable	
RapidShutdownEnabBit	Enable Rapid Shutdown	{Disable, Enable}	Disable	Disable	Disable	
FreqLv2PrtEn (CEI)	Only for Italian Grid Code	{Disable, Enable}	Disable	Disable	Disable	
PVxxFuseCheckEn (xx=1..24)	Enable the fuse check function	{Disable, Enable }				
OptiVoltMinMpptxx (xx=1..12)	Minimal voltage of Mppt optimizer	{500, 1450}	500	500	500	V
OptiVoltMaxMpptxx (xx=1..12)	Maximal voltage of Mppt optimizer	{500, 1450}	1450	1450	1450	V

Table 6-3 Other Parameters (IEEE1547 2018, Rule21 and ISO-NE)

6.4.2.2.4 Command

In the Command interface, you can access the following infomation:

Figure 6-12 Commands interface

- **Force Restart**: If a fault shutdown happens, a severe fault may have occurred inside the inverter. The user can perform a force reboot for one time per Power on in this menu if the user needs to restart the inverter.
- **FactoryrDefaults**: The manufacturer's parameter default values can be restored when the inverter is not in operation mode. Otherwise "Fault Operated" will be reported.
- **AutoTest**: Only for Italian Grid Code.
- **MPPTScan**: It is used to execute the MPPT scanning manually. The device screen will skip to normal operation interface if the MPPT scanning succeeds, or remain on the interface if the scanning fails.
  MPPT scan function is used for multi-MPP tracking, and is useful if the PV panels are partly shadowed or installed with different angles. The factory setting of MPPT scan is <Enabled, yet can also be set to Disabled. When the MPPT scan function is enabled, the scan period is 60 minutes.
  The inverter will scan the maximum power point in the MPPT range, according to the following conditions:
  - The total input power is lower than 90% of the active power.
  - Once this MPPT scan function is activated on the device, it will search the maximum power point at a voltage step of 5V in the MPPT range for full load, and retrieve the maximum power point.
- **PidSvgEnable**: When the communication between the control board and the communication board is lost in the evening, turn on the PID or SVG working mode. The SVG function can be divided into two modes.
- **SvgWorkModeEnable:** Using the SVG function or prohibit it.

6.4.2.2.5 ActivePowerDerating

The ActivePower Derating menu is used to set the active power derating parameters, including Active Power Derating, Over Voltage Derating, Over Frequency Derating, etc.

Figure 6-13 ActivePower Derating interface

You can see the Curve of over voltage derating in figure 6-14 and Curve of over frequency derating in figure 6-15.

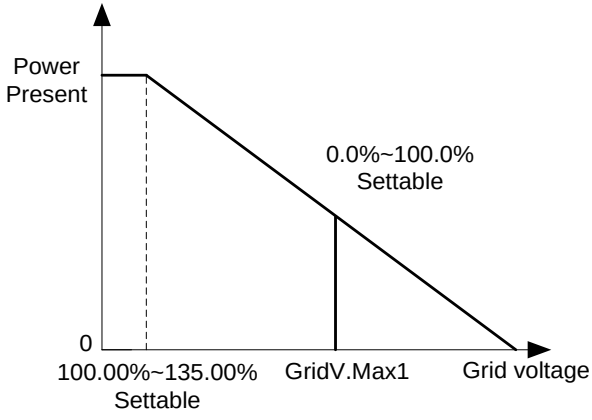


Figure 6-14 Curve of over voltage derating

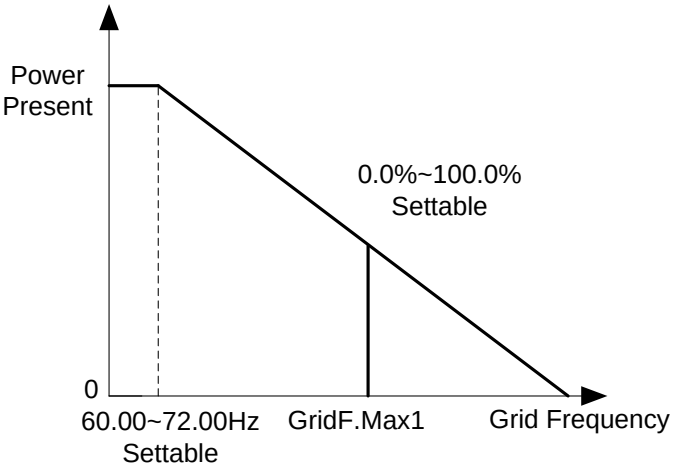


Figure 6-15 Curve of over frequency derating

In addition, the table listed below can provide detailed parameter information for you.

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
Over-Voltage Derate						
VwCurveV1	Grid Volt of VwCurve point V1	{100.00%, 110%}	106.00%	106.00%	106.00%	%
VwCurveP1	Power of VwCurve point P1	{0%,110%}	100%	100%	100%	%
VwCurveV2	Grid Volt of VwCurve point V2	{100%,115%}	110.00%	110.00%	110.00%	%
VwCurveP2	Power of VwCurve point P2	{0%,110%}	0.0%	0.0%	0.0%	%
OpenLoopRespT	Open loop response time	{0.5, 90.0}	10.0	10.0	10.0	Secs
OvrVoltDerEn	Over voltage derating enable	{ Disable, Enable}	Enable	Enable	Disable	
Over-Frequency Derate						
OvrFrqMin	The trigger frequency of over frequency derating	{60, 72}	60.04	60.04	60.50	Hz
OvrFrqMax	The end frequency of over frequency derating	{60, 72}	62.53	62.03	61.40	Hz
OvrFrqSlop	The rate of over frequency derating	{0.01, 100}	30%	30%	0.16%	%
RecoveryFrq	The recovery frequency of over frequency derating	{58.8, 66}	59.96	59.96	60.00	Hz
OvrFrqRecoveryT	The recovery time of over frequency derating	{0,1200}	60	60	60	Secs
OvrFrqDerating Mode	Over frequency derating mode	{Disable, Enable}	Enable	Enable	Disable	

UFDerEn	under frequency derating enable	{Disable, Enable}	Disable	Disable	Disable	
CtrModeActivePw	Active power control mode	{ Disable dispatch mode, Remote dispatch mode, Local control}	Disable dispatch mode	Disable dispatch mode	Disable dispatch mode	
PSetPercentLocal	Local Active power derating percent	{0%,110%}	100%	100%	100%	%
ActivePowerOver	Active power over matching	{Disable, Enable}	Enable	Enable	Enable	

Table 6-4 ActivePower Derating para. (IEEE1547 2018, Rule21 and ISO-NE)

6.4.2.2.6 ReactivePowerDerating

The ReactivePowerDerating interface is used to set the Grid reactive power derating parameters, including PF parameters and Qu parameters, etc.

Figure 6-16 The ReactivePowerDerating interface

Note: The PF and Q value can be adjusted by remote software if the “Remote” is selected.

- PF Set: Set the PF value. Note: Change the reactive power by adjusting the power factor.
- PF(P) Curve： PF curve mode. Note: The power factor changes according to the power change, as shown in Figure 6-17.

IMPORTANT!

The PF (P) Curve function is only available for IEEE1547 Grid Codes.

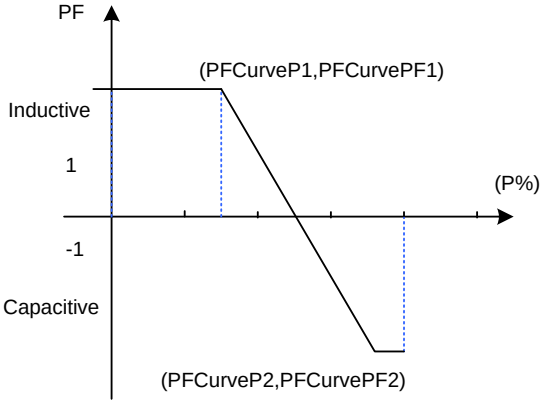


Figure 6-17 PF(P) Curve Mode

- Q(u) Curve: Q(u) curve mode.

IMPORTANT!
The Q(u) curve function is only available for IEEE1547 Grid Codes.

Note: The reactive compensation changes according to the grid voltage change, as shown in Figure 6-18.

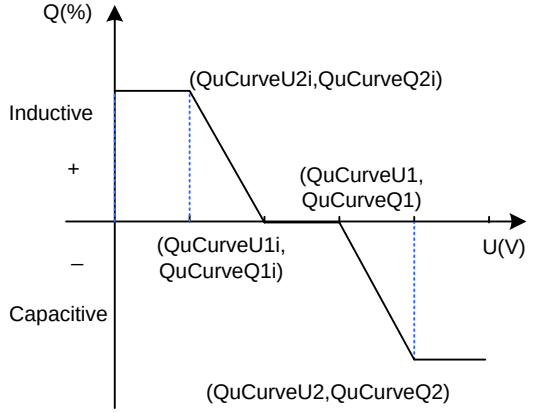


Figure 6-18 Q(u) Curve Mode

In addition, the table listed below can provide detailed parameter information for you.

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
PF(P) Power Factor Vs. Power						
PFpCurveP1	Power of PF(P) point 1	{0,110%}	50%	50%	50%	%
PFpCurvePF1	PF of PF(P) point 1	{-1,1}	1	1	1	NA

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
PFpCurveP2	Power of PF(P) point 2	{0,110%}	100%	100%	100%	%
PFpCurvePF2	PF of PF(P) point 2	{-1,1}	-0.9	-0.9	-0.9	NA
PFpCurveTriVolt	Trigger voltage of PF(P)	{100%,110%}	100%	100%	100%	%
PFpCurveUndoVolt	The undo voltage of PF(P)	{90%,100%}	90%	90%	90%	%
Q(u) Dynamic Var Support						
QuCurveU1	Voltage of Q(u) point 1	{100%, 110%}	102.00%	103.30%	107.99%	%
QuCurveQ1	Reactive power of Q(u) point 1	{-66%, 66%}	0%	0%	0%	%
QuCurveU2	Voltage of Q(u) point 2	{100%,110%}	108%	107%	110%	%
QuCurveQ2	Reactive power of Q(u) point 2	{-66%, 66%}	-44%	-30%	-50%	%
QuCurveU1i	Voltage of Q(u) point 1i	{90% ,100%}	98.00%	96.70%	92.01%	%
QuCurveQ1i	Reactive power of Q(u) point 1i	{-66%, 66%}	0%	0%	0%	%
QuCurveU2i	Voltage of Q(u) point 2i	{80%, 100%}	92%	92%	90%	%
QuCurveQ2i	Reactive power of Q(u) point 2i	{-66%, 66%}	44%	30%	50%	%
QuCurveTriPower	The trigger power of Q(u)	{5%, 100%}	20%	20%	20%	%
QuCurveUndoPower	The undo power of Q(u)	{5%, 100%}	5%	5%	5%	%
Qp Dynamic Var Support						
QpCurveP1	Active power of Q(p) point P1	{0,110%}	20.0%	20.0%	20.0%	%
QpCurveQ1	Reactive power of Q(p) point Q1	{-66%, 66%}	0.0%	0.0%	0.0%	%
QpCurveP2	Active power of Q(p) point P2	{0,110%}	50.0%	50.0%	50.0%	%
QPCurveQ2	Reactive power of Q(p) point Q2	{-66%, 66%}	0.0%	0.0%	0.0%	%
QpCurveP3	Active power of Q(p) point P3	{0,110%}	100.0%	100.0%	100.0%	%
QpCurveQ3	Reactive power of Q(p) point Q3	{-66%, 66%}	-44%	-44%	-44%	%
QpCurveOpenLoopRespTime	Open loop response time	{0, 90}	10	10	10	Secs
Mode Setting						
CtrModeReactivePw	Reactive power control mode	{Disable, Remote,Q,PF, PF(P),Q(u), Q(p)}	Q(u) curve	Q(u) curve	Q(u) curve	

Parameter name	Description	Range	Grid code IEEE-1547	Grid code RULE-21	Grid code ISO-NE	Unit
QSetPercentLocal	Local Reactive power derating percent	{-66%,66%}	0.0%	0.0%	0.0%	%
PFSetValue	PF setting value	{-1,-0.8},{0.8,1}		-0.950	1	NA
ReactivePowerOver	Reactive power over matching	{ Enable }	Enable	Enable	Enable	

Table 6-5 ReactivePowerDerating Para. (IEEE1547 2018, Rule21 and ISO-NE)

6.4.2.2.7 LcdLess Basic Parameters

The LcdLess Basic Parameters interface is used to set the parameters as below.

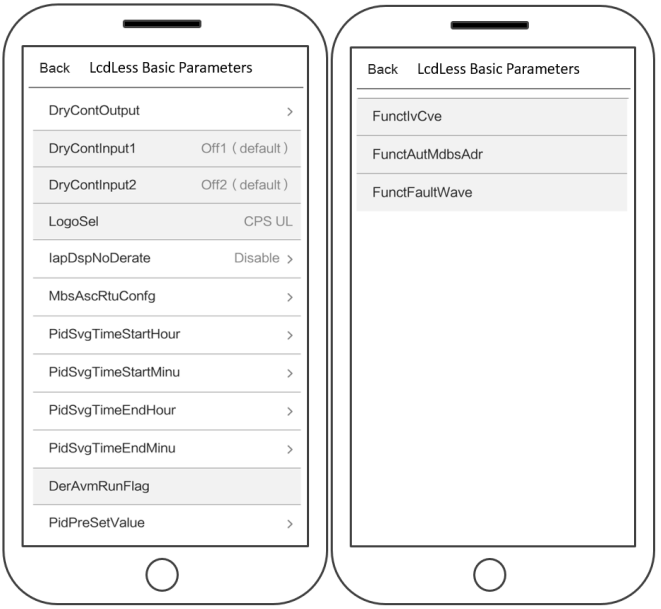


Figure 6-19 LcdLess Basic Parameters interface

The last three registers are configured as standard, i.e. the inverter supports IV curve function, Automatic MdbsAdr assignment function and the Fault recording function. However, almost all these parameters are read-only, that means you cannot change them randomly. More information, please contact the after-sale service personnel.

6.4.2.3Firmware Upgrade

As to the detailed procedures for firmware upgrade, Refer to specific instructions or consult our after-sale support personnel.

6.4.3 History

Touch the History icon, it will go to the History interface.

There are 2 submenus in the History menu: “Warning” and “Running Status”.

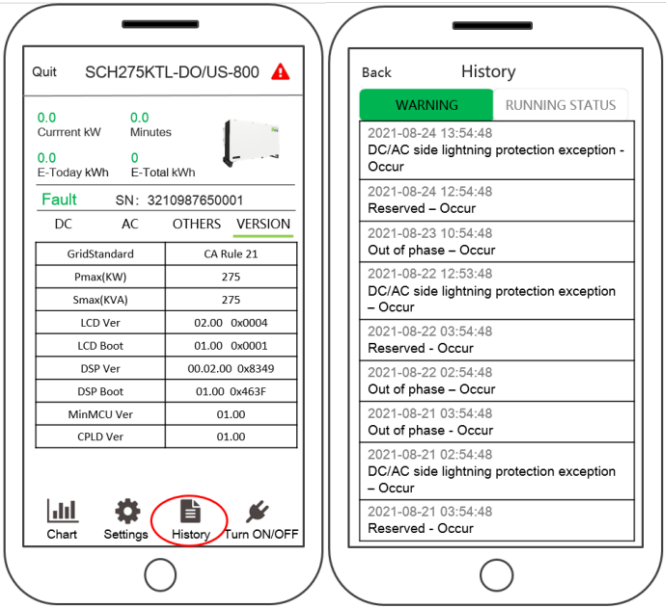


Figure 6-20 History interface

6.4.4 Turn ON/OFF

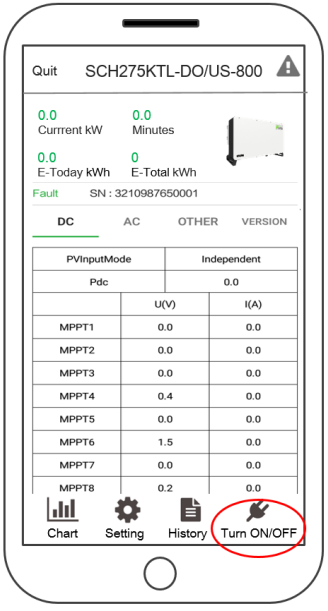


Figure 6-21 Turn ON/OFF interface

- **Manual Turn ON/OFF**: Manual Power ON/OFF is required after Grid Code setting or manual (fault) shut-down. Touch to submenu **"**Turn ON/OFF". Then move the cursor to "Turn ON" to start the inverter, the inverter will start up and operate normally if the start-up condition is met. Otherwise, the inverter will go to stand-by mode.
  Normally, it is not necessary to Turn OFF the inverter, but it can be shut down manually if Grid Code setting or maintenance is required.
  Move the cursor to submenu "Turn ON/OFF". Move the cursor to "Turn OFF" and ensure, then the inverter will be shut down.
- **Automatic Turn ON/OFF**: The inverter will start up automatically when the output voltage and power of PV arrays meet the set value, AC power grid is normal, and the ambient temperature is within allowable operating range. The inverter will be shut down automatically when the output voltage and power of PV modules are lower than the set value, or AC power grid fails; or the ambient temperature exceeds the normal range.

7 Troubleshooting

7.1 LED Indicator Troubleshooting

LED display of the inverter is shown as follows:

Figure 7-1 LED display of the inverter

Indicators and their indications are shown in Table 7-1.

LED light	Name	Status	Indication
POWER	Working power light	ON	PV Energized (control panel starts to work)
		Flash	PV no power and AC Power on
		OFF	No Power working
RUN	Grid-tied operation indication light	ON	In grid-tied power generation state
		Flash	Derated running status (light up 0.5s, light off 1.5s)
		OFF	In other operation status or power supply not working
GRID	Grid status indication light	ON	Grid is normal
		Flash	Grid fault (light up 0.5s, light off 1.5s)
		OFF	Power supply not working
FAULT	Fault status indication light	ON	Indicates a Fault
		Slow flash	Indicates Alarm (light up 0.5s, light off 2s)
		Fast flash	Protective action (light up 0.5s, light off 0.5s)
		OFF	No fault or power supply not working
ALL	Upgrade status	flash	LCD or DSP upgrading

Table 7-1 LED Indicators and their indications

If the LED light indicates any faults, please perform troubleshooting according to the Table 7-2.

LED status	Solutions
Neither the Power LED nor the LCD screen lights up.	• Turn off the external AC breaker. • Switch the DC switch to OFF position. • Check the PV input voltage and polarity.
The GRID LED is blinking.	• Turn off the external AC breaker. • Switch the DC switch to OFF position. • Check if the grid voltage is normal. • Check if the cable connection of AC side is correct and secure.
The RUN LED lights off or FAULT LED lights up.	• Refer to Table 8-2 for troubleshooting.

Table 7-2 Troubleshooting based on LED Lights

7.2 Common Fault and Troubleshooting

The inverter will be shut down automatically if the PV power generation system fails, such as output short circuit, grid overvoltage/under voltage, grid over frequency/under frequency, high environmental temperature or internal malfunction of the machine. The fault information will be displayed on the APP interface.

The issue can be identified and resolved based on the definitions, possible causes and recommended solutions listed in the following table. There are generally 3 types of fault: warning, protection and hardware fault. Proper analysis is recommended before contacting after-sales service.

Types	Fault Codes	Solutions
Warning Faults	CommErr	Definition: Communication inside inverter fails
		Possible causes: Terminal block connecters of internal communication wires have poor contact
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Switch off 3-phase working power supply and then reboot the system; 3. Contact after-sales service personnel.
	ExtFanErr	Definition: Cooling fan failure by visual check
		Possible causes: 1. Fan is blocked; 2. Fan service life has expired; 3. Fan socket connecter has poor contact.

		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Check for foreign objects on fan blades; 3. Switch off 3-phase work power supply and then reboot the system; 4. Contact after-sales service personnel.
	IntFanErr	Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Check for foreign objects on fan blades; 3. Switch off 3-phase work power supply and then reboot the system; 4. Contact after-sales service personnel.
	Warn0030 (EepromErr)	Definition: Internal alarm
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Contact after-sales service personnel.
	Warn0040 (DC SPD fault)	Recommended solutions: The alarm is reserved now. The alarms in field can be ignored.
	Warn0050 (TempSensorErr)	Recommended solutions: 1. Observe temperature display; 2. Switch off 3-phase working power supply and then reboot the system; 3. Contact after-sales service personnel.
	Warn0100 (AC SPD fault)	Recommended solutions: The alarm is reserved now. The alarms in field can be ignored.
Protection Faults	Protect0090 (Bus over voltage)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	Protect0070 (Bus imbalance)	1. Raise limit of IDCmax (for example, 400mA) to allow inverter more room to adjust in transient condition to cope with imbalance of impedance and voltage between Grid phases 2. If after adjustment, alarm still occurs, replace inverter

	Protect0030 (Inverter Over Current)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	GridV.OutLim	1. Make sure the grid connection is good. 2. Restart the inverter again.
	GridF.OutLim	1. Check the AC wires connection and AC frequency is in range; 2. Check the measurement value in LCD, if the grid frequency is in limit, restart the inverter.
	Protect0020 (Grid relay error)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	TempOver (Over-temperature protection)	1. Confirm that external ambient temperature is within the specified range of operating temperature; 2. Check whether air inlet is blocked; 3. Check whether fan is blocked; 4. Check whether the location of installation is appropriate or not; 5. Observe for 30 minutes and see whether the alarm will be eliminated automatically; 6. Contact after-sales service personnel.
	Protect0180 (The sampling offset of DCI)	1. If the inverter can start up, then recalibrate. 2. If the inverter always report this alarm and cannot start up, then replace inverter.
	Protect0170 (DCI high)	1. Raise limit of DCImax (for example, 400mA) to allow inverter more room to adjust in transient condition to cope with imbalance of impedance and voltage between Grid phases 2. After raising limit, if inverter cannot clear fault, replace inverter.
	IsolationErr (Insulation resistance low)	Check wires of PV and ground: 1. Turn OFF AC switch to disconnect inverter from Grid. 2. Open fuse drawers to de-couple PV strings from each other. Test strings with string test set. 3. Add one PV string at a time, and start up inverter to see if alarm occurs.

		4. If there is no alarm, turn OFF AC switches to disconnect from Grid and add in the next string. Startup inverter again. 5. Continue until you can find the string that triggers the alarm. Trace wirings of faulted string to find any leakage to Earth Ground. 6. The parameter ISOResist in hidden menu can be adjusted a bit.
	GFCIErr (leakage current high)	Check wires of PV and ground: 1. Turn OFF AC switch to disconnect inverter from Grid. 2. Open fuse drawers to de-couple PV strings from each other. Test strings with string test set. 3. Add one PV string at a time, and startup inverter to see if alarm occurs. 4. If there is no alarm, turn OFF AC switches to disconnect from Grid and add in the next string. Startup inverter again. 5. Continue until you can find the string that triggers the alarm. Trace wirings of faulted string to find any leakage to Earth Ground.
	Protect0150 (Mini MCU Fault)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	Protect0110 (BUS over voltage (firmware))	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	Protect0100 (The sensor fault of leakage current)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace Filt board or inverter.
	Reverse PVx electrode (x=1,2…12)	1. Turn DC Switch OFF 2. Open Fuse holder to isolate PV strings 3. Use meter to find out which PV string is connected in reverse polarity. 4. Correct PV string connection. 5. Contact after-sales service personnel.

	High PVx Input current (x=1,2…12)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. Contact after-sales service personnel.
	High PVx Input voltage (x=1,2…12)	1. Check if its input voltage is within 1100V; 2. Restart inverter by recycle both AC and DC switches. 3. Wait for 1 minute between OFF and ON for all energy to discharge. 4. Contact after-sales service personnel.
	PVVoltOver	1. Measure voltage at DC terminals in wiring box and compare with reading in Measurement menu. PV voltage must be less than 1000V in open circuit condition. 2. If display reading is not within 2% of meter reading, replace inverter. 3. If display reading is within 2% of meter reading, adjust number of panel in the string.
	Protect0230 (Inverter open-loop self-test fault)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
Hardware Faults	Fault0130 (Bus over total voltage)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	Fault0110 (Bus imbalance)	1. Raise limit of IDCmax (for example, 400mA) to allow inverter more room to adjust in transient condition to cope with imbalance of impedance and voltage between Grid phases 2. If after adjustment, alarm still occurs, replace inverter.
	Fault0100 (Grid relay fault)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	Fault0090 (Static leakage current high)	Check wires of PV and ground: 1. Turn OFF AC switch to disconnect inverter from Grid.

		2. Open fuse drawers to de-couple PV strings from each other. Test strings with string test set 3. Add one PV string at a time, and startup inverter to see if alarm occurs. 4. If there is no alarm, turn OFF AC switches to disconnect from Grid and add in the next string. Startup inverter again. 5. Continue until you can find the string that triggers the alarm. Trace wirings of faulted string to find any leakage to Earth Ground.
	Fault0060 (CPLD Fault)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace Control Board or inverter.
	Fault0020 (Bus over volt Hardware)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.
	Fault0150 (Open-loop self-check failure)	1. Restart inverter by recycle both AC and DC switches. 2. Wait for 1 minute between OFF and ON for all energy to discharge. 3. If inverter cannot clear fault, replace inverter.

Table 7-3 Troubleshooting list

DANGER!

Please disconnect the inverter from AC grid and PV modules before opening the equipment. Make sure hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least 5 minutes after disconnecting all sources of DC and AC.

8 Maintenance

WARNING!

- Before starting any product maintenance, the inverter should be stopped running, the AC circuit breaker connected to the grid and the PV input on the DC side shall be all disconnected, and then wait at least 5 minutes before starting any operation.
- These servicing instructions are for use by qualified personnel only.
- To reduce the risk of electrical shock, do not perform other servicing other than those specified in the operation instructions unless you are qualified to do so.

8.1 Check Electrical Connections

- Check all the cable connections as a regular maintenance inspection every 6 months or once a year.
- Check the cable connections. If loose, please tight all the cables acc. to section 4.5 Electrical Cable Connection.
- Check for cable damage, especially whether the cable surface is scratched or smooth. Repair or replace the cables if necessary.

8.2 Clean the Air Vent Filter

The inverter can become hot during normal operation. Inverter uses built-in cooling fans to provide sufficient air flow to help in heat dissipation.

In order to ensure good ventilation and heat dissipation of the inverter, it is necessary to check the air inlet and outlet regularly.

Ensure that air inlets and outlets are not blocked and clean the vent with soft brush or vacuum cleaner if necessary.

8.3 Replace the Cooling Fans

If the internal temperature of the inverter is too high or abnormal noise is heard assuming the air vent is not blocked and is clean, it may be necessary to replace the external fans.

IMPORTANT!

Please disconnect the AC & DC power before replacing the fans.

Refer to Figure 8-1 for replacing the cooling fans.

1. Use a No.2 Phillips head screwdriver to remove the 8 screws fixing the fan tray.

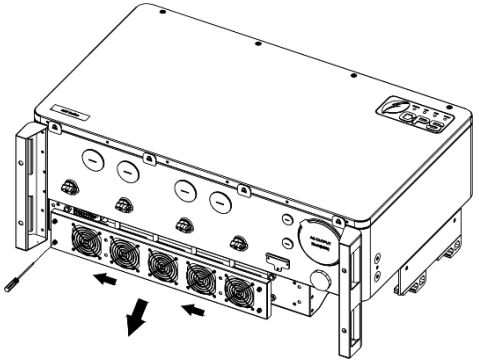


Figure 8-1 Remove the fan tray and fan

2. Disconnect the watertight cable connector from cooling fan, as shown in Figure 8-2.

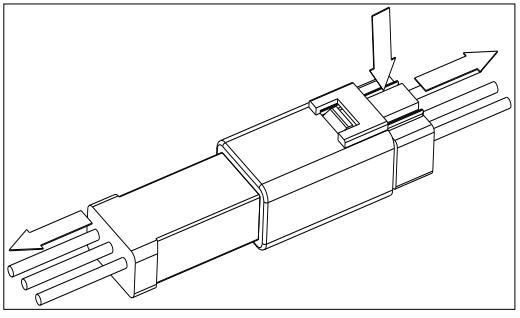


Figure 8-2 Disconnect the watertight cable connector

3. Use a No.2 Phillips head screwdriver to remove the 4 screws fixing every fan. (Figure 8-3)

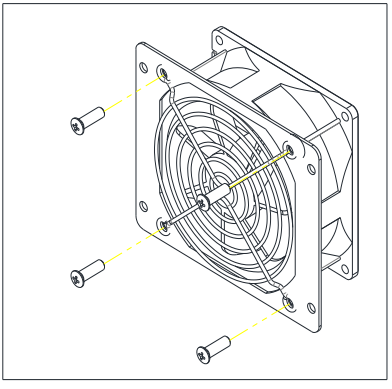


Figure 8-3 Replace cooling fans

4. Place the new cooling fans on the fan tray, and fasten the cable on the fan tray with cable ties. Tools required: No.2 Phillips head screwdriver, torque value: 14~18kgf.cm
5. Reinstall the assembled fans onto the inverter. Tools required: No.2 Phillips head screwdriver, torque value: 16kgf.cm.

8.4 Replace the Inverter

IMPORTANT!

Make sure the AC breaker and DC switch of inverter are turned off.

Replace the inverter in reverse order relative to the installation steps in section 3.4 Install the Inverter:

1. Use a #3 Philips head screwdriver to remove the two M6X90 screws.
2. Remove the inverter from its mounting bracket with the coordination of 3 people.
3. Replace the new inverter on the mounting bracket and fasten it.

9 Technical Data

9.1 Datasheet

Model No.	CPS SCH275KTL-DO/US-800
DC Input	
Nominal input power	285 kW/260 kW
Max input voltage	1500Vdc
MPPT full load operating input voltage range	500-1450Vdc
MPPT voltage range @ PF>0.99 (1)	900-1300Vdc
Turn on voltage/Power	550V/500W
Nominal input voltage	1190 Vdc
Number of MPPT/Max no. of DC input channels	12/36
No. of DC input	36 Fused Inputs, 3 per MPPT or 24 Non-Fused Inputs, 2 per MPPT (determined by SKU)
Max input current	60A x 6 / 30A x 12 / 30A x12
Max input short-circuit current	90A x 6 / 50A x 12 / 50Ax12
DC Disconnection Type	Load-rated DC switches
AC Output	
Nominal AC output power(2)	275kW
Maximum AC output power	275kVA
Nominal AC voltage(2)	800Vac
Output voltage range	704-880Vac
Grid connection form	3Φ/ PE
Maximum AC output current @800Vac	198.5A
Nominal power frequency	50 / 60Hz
Output frequency range	57- 63Hz
Power factor	>0.99 (±0.8 adjustable)
Current harmonic distortion	<3%
AC disconnect type	-
Max. output fault current and duration	910A @11.6 ms

Max. output overcurrent protection	300A
System parameters	
Topology	Transformerless
Maximum efficiency	99.0%
China efficiency	98.5%
Standby/Night loss	<5W
Environmental parameters	
Protection level	NEMA TYPE 4X
Cooling method	Variable speed cooling fans
Operating temperature(3)	-22°F to +140°F / -30°C to +60°C (derating from +107°F / +42°C)
Operating humidity	0-100%, No condensation
Operating altitude(4)	2500m， No derating
Display and communication	
Display	LED indicators, WiFi + APP
Communication	Modbus RS485/Ethernet TCP/IP/PLC/CAN
Structural parameters	
Dimensions (WxHxD) (mm)	1050x690x400
Weight (kg)	119
Fused String Inputs(5)	20A fuses provided (Fuse values up to 30A acceptable)
Safety	
Safety and EMC standards	UL1741_2018; CSA-22.2 NO.107.1-16; FCC CFR 47 part15.
Grid-connected specification	IEEE1547_2003; IEEE1547_2014; IEEE1547_2018; CA Rule21; HECO Rule 14H; HECO-ML; ISO-NE.

Table 9-1 Datasheet of the inverter

Notes:

1. When the DC input voltage is lower than 900V or higher than 1300V, the inverter begins derating. Once the input voltage is between 900-1300V, the inverter supports full output power. Derating curve of PV input voltage are as shown in Figure 9-1.

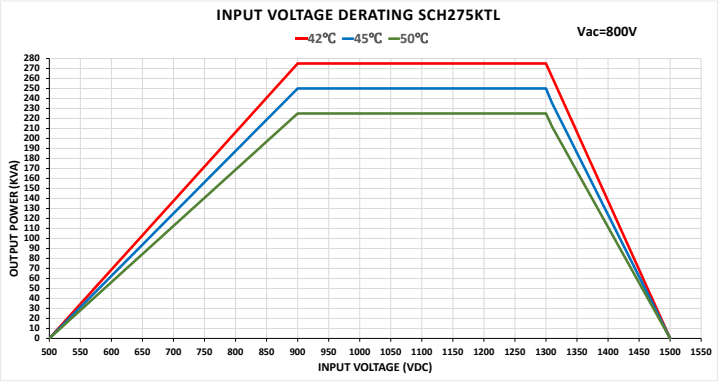


Figure 9-1 Derating curve with DC input voltage

2. When the grid Voltage is within 100%~110% of the rated output voltage, the inverter output power may reach 100%. When the grid voltage is lower than 100%, the inverter will limit the AC Output Current and the output power will begin to derate, as shown in Figure 9-2.

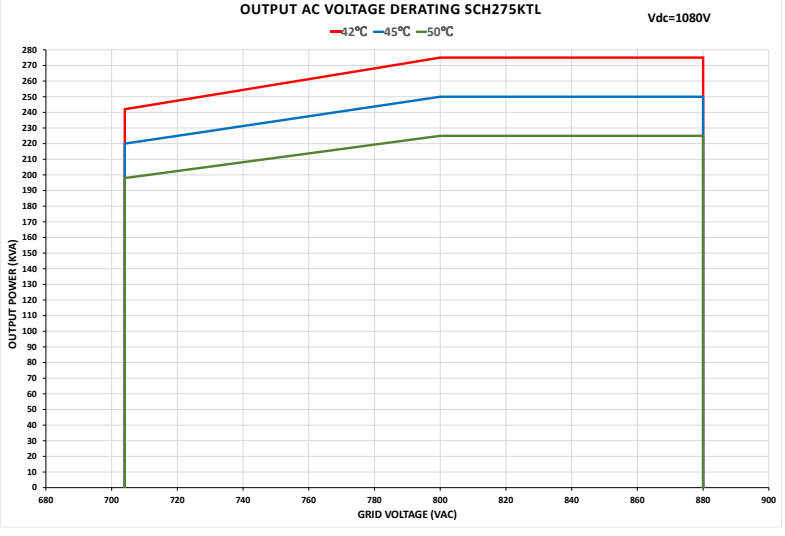


Figure 9-2 Derating curve with grid voltage

3. When the ambient temperature is higher than 42°C, the inverter output power will begin to derate, as shown in Figure 9-3.

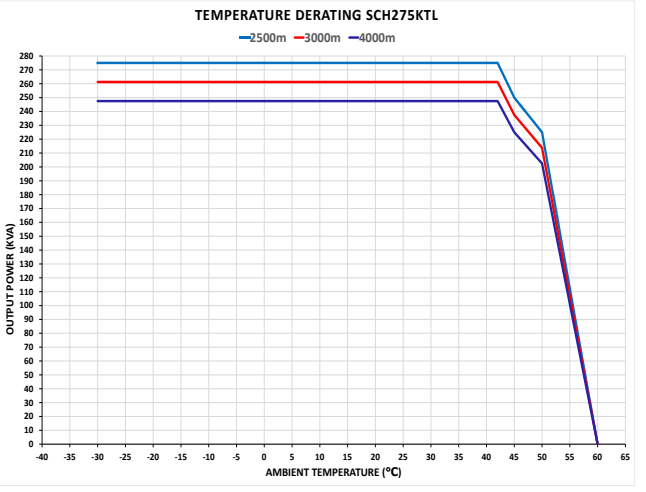


Figure 9-3 Derating curve with high temperature

4. The highest no-derating working altitude level is 2500m for this inverter, its derating situation is as shown in Figure 9-4.

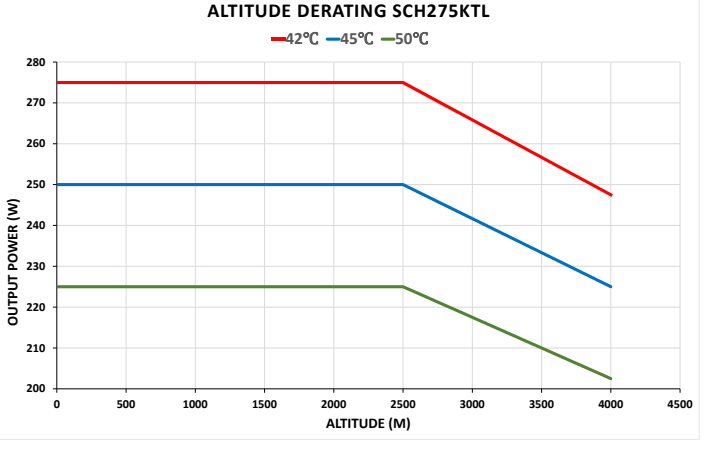


Figure 9-4 Derating curve with working altitude

5. Fused string inputs only applicable to the SCH275KTL 36 input model.

P-Q Capabilities at Nominal Output Voltage

Inverter is capable providing reactive power of ±165kVAR at nominal grid voltage and rated ambient temperature. Chart below details inverter reactive power capabilities at various input voltages and various ambient temperature condition.

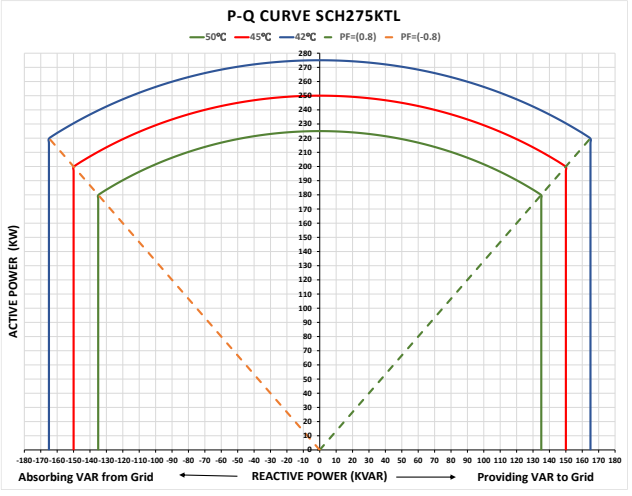


Figure 9-5 P-Q Capabilities at Nominal Output Voltage

9.2 Measurement Tolerance

The data supplied by the inverter may differ from measurements taken by certified measuring instruments (e.g. output meters, millimeters and grid analyzers). The inverter is not a measuring instrument and has wider tolerances for the measurement results it gives.

The general inverter tolerances are as below:

- ±5% for real-time measurements with output power below 20% nominal power
- ±3% for real-time measurements with output power above 20% nominal power
- ±4% for all statistical data

CPS inverter tolerances are specified as below:

- Voltage tolerances: ±1%
- Current tolerances: ±2%
- Frequency tolerances: ±0.01Hz
- Power tolerances: ±5%
- Power factor tolerances: ±0.01
- Time tolerances: ±1%
- Temperature tolerances: ±2degC

10 Quality Assurance

10.1 Warranty

The warranty period of this product is 60 months (5 years); if there is a contract, the warranty period shall be implemented in accordance with the contract.

10.2 Liability Exemption

1. Damage during transportation;
2. Operate in an environment beyond the provisions of this manual;
3. Incorrect or inappropriate use of the product (including installation and use);
4. Unauthorized modification of the product or provided software;
5. Ignore the safety warnings and relevant statutory safety regulations contained in the product and documentation;
6. Unforeseen disasters or irresistible accidents occur.

10.3 Warranty Clauses

1. For products that fail during the warranty period, our company will repair or replace new products free of charge;
2. The unqualified product under replacement should be returned to our company;
3. It is necessary to provide a reasonable time for the company to overhaul the equipment.
4. For more warranty terms, refer to the CPS America standard warranty policy in place at time of purchase

11 Contact Information

If you still have any questions about the photovoltaic grid-connected inverter, please feel free to contact us, we will be very happy to help you.

CHINT POWER SYSTEMS AMERICA CO., LTD.
Address: 1297 N Plano Rd Richardson Texas 75081
Service Hotline: 855-584-7168
Email: AmericaSales@chintpower.com
Website: www.chintpowersystems.com

Shanghai CHINT Power Systems Co., Ltd.
Headquarters: Building 4, No. 3255, Sixian Road,
Songjiang District, Shanghai, China
Tele: +86 -21 -3779 1222 -6300
Fax: +86 -21 -3779 1222 -6001

12 Appendix

12.1 Appendix A: Figure list

12.2 Appendix B: Table list